THE AMERICAN
School Board Journal

A PERIODICAL OF SCHOOL ADMINISTRATION

Devoted to the Interests of School Boards, Superintendents,
School-Business Officials, and School Architects

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INDEX TO TITLES AND AUTHORS

Volume 124—January to June, 1952

Abbreviations: (Ed.) Editorial; (N) News Articles

DEPARTMENT NEWS

THE AMERICAN School Board Journal

A PERIODICAL OF SCHOOL ADMINISTRATION

large

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THE AMERICAN
School Board Journal
A Periodical of School Administration

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DEPARTMENTS:

The multi-use Community Room shown is in the Clyde L. Lyons Elementary School, Glenview, Illinois. Perkins & Will, architect-engineers, Chicago

What's happened to the little dull Schoolhouse?

It's being flooded with daylight! The children love it—and a light, cheerful room is good for them.

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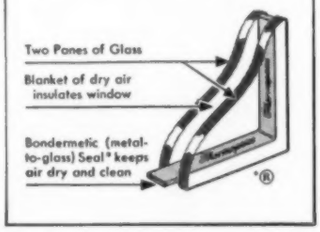

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"All Aboard"

N.S.B.A. Convention Plans and Other School Boards Association News

*Edward M. Tuttle**

These columns are designed primarily to keep readers of the JOURNAL informed concerning activities among associations of school boards, state and national. But for the past two months the problem of critical materials for school construction has been so pressing that the space has been given over wholly to reporting the latest information on that subject. This month, however, after a brief comment on the materials situation, I want to return to association developments.

The allocations picture has slightly improved over that reported last month. On November 26, Manly Fleischmann, DPA Administrator, told the Senate-House Defense Production Committee, which is considering possible amendments to the Defense Production Act, that a supplemental allocation of 15,000 tons of steel, solely for elementary and secondary school construction, would be added to the 96,296 tons already allotted for all educational construction in the first quarter, 1952. Only 10 per cent of the supplemental allotment will be structural steel.

While this additional "dribble" of steel, given only after unparalleled testimony as to the nation's need, will enable about 200 more starts to be made on new construction, it still leaves over 1000 approvable applications pending before the U. S. Office of Education, which will receive no materials and will have to be deferred. Consult again my article in the December JOURNAL for a complete analysis of the situation.

National Association Anticipates Its Biggest Convention in St. Louis

All indications point to two or three times as many school board members in attendance at the 1952 Convention of the National School Boards Association as have ever been present in years past. This is the result of two factors: (1) the growing prestige and strength of the association movement in the states and nationwide, and (2) the fact that the meeting will be centrally located this year. Data in brief may be summarized as follows:

The Time: Friday and Saturday, February 22–23, 1952

(Joint sessions with the American Association of School Administrators will follow on Sunday, Monday, and Tuesday, and all board members who can should plan to stay over.)

*Secretary, National School Boards Association, Chicago, Ill.

CORRECTION

If something goes wrong, it is more important to talk about who is going to fix it than who is to blame.
— FRANCIS J. GABLE

Recently it has become a popular, public pastime to try to pin something on someone else. If tempted in this direction, we had better pause to recall that no man or woman is without fault, accusers as well as accused. The only people who make no mistakes are those who never accomplish anything. To act positively is always to run the risk of error. The world owes much to those willing to accept this risk and to move ahead. Talking of who is to take the blame for a wrong that already has been done is not nearly so profitable as seeking the person who can accomplish its correction and giving him the opportunity. Often we may discover that the two are one and the same. — *E. M. T.*

The Place: The Statler Hotel, St. Louis, Mo.
The Theme: "Working Together for Public Education"
The Program (in outline):

Friday, February 22

8:00 a.m. on — Registration
9:30 a.m. — Opening Session: Ceremonies of welcome; president's address; reports of executive secretary and treasurer; announcements; etc.
2:00 p.m. — Second General Session: "Written Policies for Boards of Education." Keynote speaker followed by break-up into numerous small discussion groups. Summary of conclusions in general meeting.
7:30 p.m. — Third General Session: Address by Dr. Virgil M. Rogers, Battle Creek, Mich., Chairman 1952 A.A.S.A. Yearbook on "The Superintendency of Schools." Followed by the main N.S.B.A. business meeting (see section below).

Saturday, February 23

7:30 a.m. — State Association Presidents' Breakfast (state secretaries invited).
9:30 a.m. — Fourth General Session: "School Construction and Equipment." (1) A summary of the State Surveys under Public Law 815 by Paul J. Keith, School Facilities Survey Representative of the U. S. Office of Education. (2) Address on the current situation under the Controlled Materials Plan by Dr. Rall I. Grigsby, Director, Civilian Requirements Division, U. S. O. (3) Ample time for questions and discussion from the floor.
2:00 p.m. — Section Meetings
1. For members of boards of education in places of over 200,000 population. Program to center around two subjects: (*a*) what it means to be a board member in a big city; (*b*) questions of budget-making and finance.
2. For members of boards of education in places of under 200,000 population. This program is still to be detailed, but will probably center around various aspects of the why and how of citizen participation in public education and the school board's relation to such activities.
3. For state association secretaries — a workshop session on their own problems.

4:00 p.m. — Final business session of voting delegates.
6:30 p.m. — Annual Banquet: Distinguished guests, featured music, and an outstanding lay speaker — District Judge Luther W. Youngdahl, former Governor of Minnesota.

Convention Committees

Established N.S.B.A. policy requires the naming of a Committee on Resolutions three months prior to the national convention. Accordingly, at Thanksgiving time President Trotter released all committee appointments which had been completed up to that time, as follows:

General Convention Chairman: J. G. Stratton, Oklahoma.

Resolutions Committee: O. H. Roberts, Jr., Indiana, Chairman; Everett R. Dyer, New York; Frank H. Gorman, Nebraska; M. L. Marquette, Louisiana; Mrs. I. E. Porter, California; Ted Reames, Washington; Mrs. Edwin Troland, Massachusetts.

Program Committee: Myron W. Clark, Minnesota, Chairman; Russell B. Creaser, South Dakota; J. G. Gleason, Sr., Montana; W. O. Goodman, Oklahoma; F. H. McKelvey, Ohio; S. H. Sixma, Michigan; J. H. Woodall, Georgia.

Registration Committee: W. A. Shannon, Tennessee, Chairman; Don Foster, Iowa; Jesse Foster, New Jersey; Bascom Hayes, Texas; Elmer W. Stanley, Washington; Maurice E. Stapley, Indiana; P. O. Van Ness, Pennsylvania; W. A. Wettergren, Minnesota; H. E. Wrinkle, Oklahoma.

Hospitality Committee: Mrs. Irma H. Friede, Missouri, and Grant L. Stowell, Idaho, Co-Chairmen. Membership to be filled.

Nominating Committee: J. Reinhard Wilson,

(Continued on page 8)

Another Herman

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(Continued from page 5)

Illinois, Chairman; Cyrus M. Higley, New York; W. I. Kocurek, Texas; Jack Merchant, California; O. H. Paschka, Minnesota.

Committee on By-Laws and Finance: Clifton B. Smith, New York, Chairman; Robert M. Cole, Illinois; Dr. T. T. Hicks, Arizona; Fred G. Thatcher, Louisiana; J. M. Whitehead, Massachusetts.

Auditing Committee: Edwin T. Coulbourn, Virginia, Chairman; Carl B. Althaus, Kansas; F. J. Brewer, Wisconsin.

Publicity: Charles H. Russell, Pennsylvania.

Important Business Sessions

The National School Boards Association is still young and still feeling its way as to most effective organization and operation. In consequence, the business sessions at the National Convention are anything but perfunctory. They are vital to the future of the association, and decisions need to be made with the greatest care and forethought on the part of all.

This year, in addition to the election of officers for the ensuing year and the passage of basic resolutions establishing N.S.B.A. policy with regard to various national issues, there will be up for study and reconsideration such matters as the terms and succession of officers in the association, the method of representation by states which at present is limited to two voting delegates from each state, the adjustment of the schedule of financial support by states to a more recent base than 1947–48 school expenditures, the extent to which official co-operative relationships with other organizations should be entered into by the association, and other items of hardly less importance.

In the category of co-operative relationships, consideration will be given to a request that the N.S.B.A. join the proposed National Council for the Accreditation of Teacher Education which is planned to include a total of 21 members — six from the legal state education agencies (National Council of Chief State School Officers and National Association of State Directors of Teacher Education and Certification), six from teacher practitioners (National Commission on Teacher Education and Professional Standards), six from teacher-education institutions (American Association of Colleges for Teacher Education), and three boards of education representing the interest of the lay public (National School Boards Association). This is a new departure in educational planning, designed to bring the public into active co-operation with the profession, and offers a challenge which must be met squarely and courageously.

Judge Youngdahl to be Banquet Speaker

It is a pleasure to announce that Judge Luther W. Youngdahl of the United States District Court in the District of Columbia since last October 1 will be the featured speaker at the N.S.B.A. banquet on Saturday evening, February 23. As everyone knows, Judge Youngdahl was Governor of Minnesota from 1947 until his appointment to the federal bench. Widely known as a friend of public education during his administration as governor, he has been in great demand as a speaker on this subject to both professional and lay audiences. Few can present the case for universal public education in America more winningly or more convincingly than he. While governor he also called upon three of the outstanding leaders in the Minnesota School Board Association to accept appointments at the state level, one as the State Commissioner of Agriculture, Dairy, and Food, and the other two as members of the State Board of Education which in that state appoints the State Commissioner. All who are fortunate enough to attend the banquet at the St. Louis Convention will find themselves richly rewarded in listening to Judge Youngdahl's stirring message in these critical times for our schools and our country.

President Trotter Featured Speaker on Sunday Evening at the A.A.S.A.

Dr. Kenneth E. Oberholtzer, president of the American Association of School Administrators, has greatly honored the National School Boards Association by inviting our president, Frank H. Trotter of Chattanooga, Tenn., to be the guest speaker at the general session of the A.A.S.A. on Sunday evening, February 24. Mr. Trotter will speak on the subject of "The Citizen's Obligation to the Schools," and what he has to say will be of

(Concluded on page 10)

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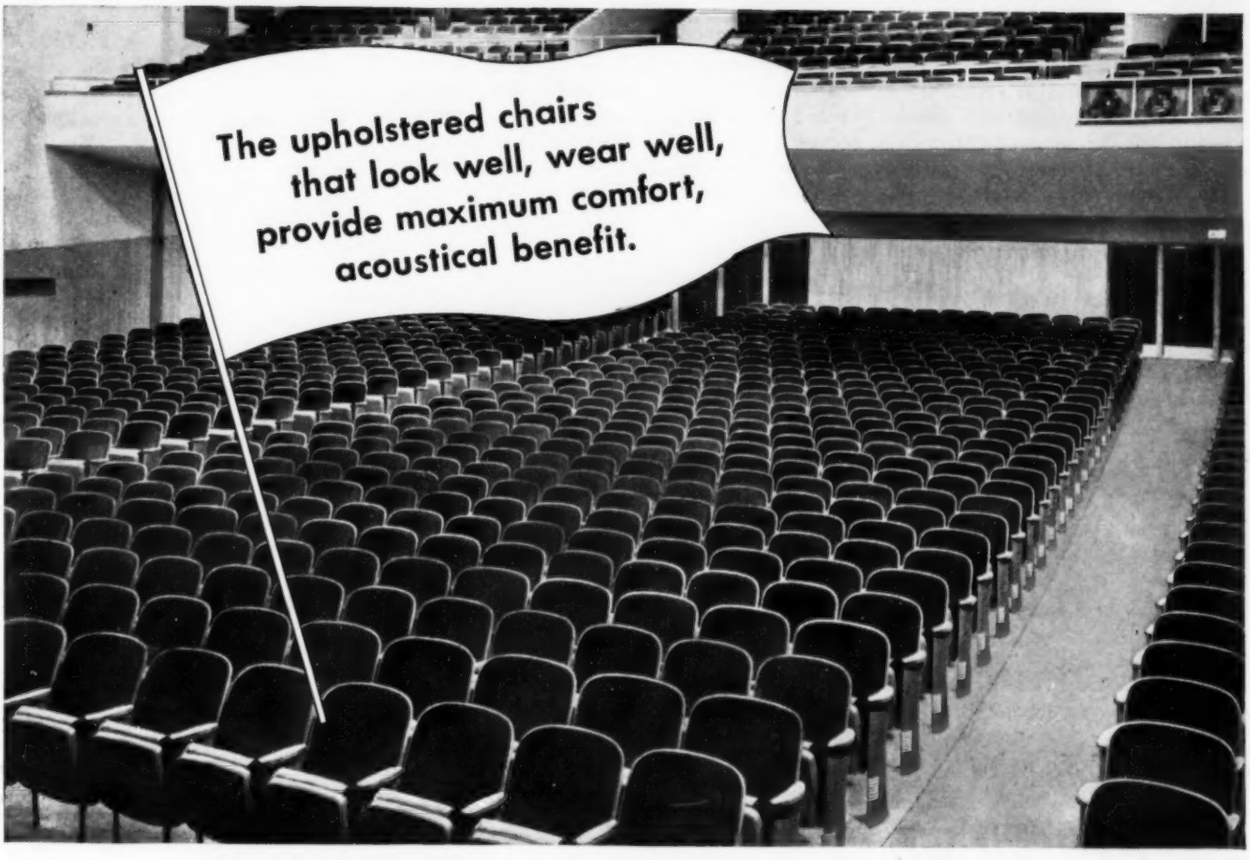

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(Concluded from page 8)

vital concern to all administrators, school board members, and citizens generally who are in the audience.

In Chattanooga, Mr. Trotter is the elected city Commissioner of Education and Health, and as such is president of the local appointed board of education. He is also president of the Tennessee School Boards Association and a member of various state committees and commissions. Long and varied experience in public school affairs, combined with unquestioned integrity and the personal charm of a true southern gentleman lend keen anticipation to Mr. Trotter's appearance on this occasion. Every board member who can be in St. Louis that evening should add the support of his presence at the session.

Other joint meetings of administrators and board members will occur on Monday and Tuesday. Monday afternoon a discussion group under the chairmanship of Superintendent Roscoe H. White, Shreveport, La., will take up the question of "Boards of Education and Their Public Relations (including Press Relations)." On Tuesday, clinic groups both morning and afternoon will include board members in a study of "The Superintendent and the Superintendency." Superintendent James K. Michie, Hibbing, Minn., will direct this clinic.

Changes in National Officers

Due to a reorganization of districts and resulting combination of school boards, Second Vice-President Robert Gustafson of Colorado lost his local board membership last summer. Although the N.S.B.A. Constitution gave him the right to hold office until the 1952 Annual Convention, he saw no way of making the trip to St. Louis in February and felt that he should resign and give place to someone who could be active meantime.

After some correspondence, President Trotter reluctantly accepted Mr. Gustafson's resignation and appointed Director Myron W. Clark of Minnesota to be second vice-president for the unexpired term. In Mr. Clark's place as director until the February meeting, President Trotter appointed Mrs. Edwin Troland of Massachusetts. Mrs. Troland is one of the founders and was the first president of the Massachusetts Association of School Committees and was on our program in Atlantic City last year as chairman of the Public Education Division of the Education Department of the General Federation of Women's Clubs.

New Directory This Month

More than twenty changes have occurred since August among the presidents and secretaries of state school boards associations. Sometime in January a new and revised Directory will be issued from the headquarters of the N.S.B.A. Persons or organizations having use for copies may obtain them by addressing the National School Boards Association, Inc., 450 East Ohio Street, Chicago 11, Ill.

COMING CONVENTIONS

Jan. 9–10. ***Tennessee School Boards Association,*** **at Andrew Jackson Hotel, Nashville, Tenn. Secretary, W. A. Shannon, Nashville. Attendance. 200.**

Jan. 10–11. *Tennessee Public School Officers' Association,* at Andrew Jackson Hotel, Nashville. Secretary, John L. Meadows, Cookeville. Attendance, 500.

Jan. 25. ***Oklahoma State School Boards Association,*** **Huckins Hotel, Oklahoma City. Secretary, H. E. Wrinkle, Faculty Exchange, Norman. Attendance, 300.**

Jan. 22–24. *Manitoba School Trustees Association,* at Winnipeg, Manitoba, Canada. Secretary, Robert Love, Melita, Can. Attendance, 650.

Feb. 22–23. ***National School Boards Association,*** **at Statler Hotel, St. Louis, Mo. Secretary, Edward M. Tuttle, 450 E. Ohio St., Chicago, Ill. Attendance, 600.**

Feb. 23–27. ***American Association of School Administrators,*** at Kiel Auditorium, St. Louis, Mo. Secretary, Worth McClure, 1201 Sixteenth St., N.W., Washington 6, D. C. Attendance, 8000.

GOLDEN JUBILEE PHILIPPINE SCHOOLS

December 10–16, 1951 was observed throughout the Islands as the Golden Jubilee Week to commemorate the establishment of the Philippine educational system. The theme for the week was Education for Freedom.

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JANUARY 1952

Tapping Community Resources in Planning School Buildings

Paul W. Seagers *

During the past twenty-five years there has been a gradual change in the type of training given school administrators. Just previous to this period stress was placed upon efficiency, especially in finance and school accounting. The board of education and superintendent ran the schools with little or no counseling from the citizens of the community. Pressures in the community built up and a rapid turnover of superintendents frequently occurred where progressive tendencies, increased taxes, and school building programs were advocated. In fact, until rather recently in some sections of our country the promotion of a building program was considered tantamount to the resignation of the superintendent.

Leading superintendents and educational institutions studied the situation. We witnessed the passing of a decade or two with much talk and few demonstrations. It was delightful to sit at the feet of the great proponents of democratic school administration in the university schools of education, but to go back home and put these theories into action was quite a different thing. Finally a few brave souls attempted to introduce a democratic practice or two in their communities. School publicity became public relations; surveys became co-operative undertakings. Citizens' committees were invited by the school authorities to think through the curriculum needs of the schools. Now we have several thousand citizens' advisory committees in city and county school systems to study local school problems and to co-operate with the school boards and superintendents in bettering school conditions.

This development has not come without many problems and the "rolling of the heads" of some of the brave. The big problem has been to translate the college men's theory into practical techniques which can be applied in local situations. Some professors came out of their ivory towers and worked with the men in their communities. Others followed to the extent that the wide-awake communities now want administrators trained or experienced in various phases of democratic leadership. Probably today there are no one hundred per cent democratically administered school systems because the optimum in democracy is idealistic and the degree to which it can be attained must of necessity depend upon the refinement of the civilization which attempts it. Witness, for instance, our attempts to introduce our type of democracy into Western Europe. Many of our failures to make it work there are due to the fact that we didn't understand the nature of democracy. We cannot inherit democracy. The most we can inherit is the political, moral, social, and educational framework within which we can practice certain phases and degrees of democracy. Each generation, in fact each individual, has the responsibility for developing and extending democratic practices. Government and officials, including school officials, can only offer leadership and maintain the framework of democracy within which the citizens must function or take the chance of reverting to bureaucracy and perhaps totalitarianism.

The New School Building as Opportunity

Tapping community resources in planning school buildings is only one of the many facets of democratic administration. Yet it is one of the easiest to put into effect when a few basic techniques are used. The school building is something tangible. Its defects are tangible when certain standards and criteria are used for evaluation. Evidence of the need of new school plants either for replacement or expansion is something that is understood by most people. Thus we start with something which Mr. and Mrs. Citizen can understand with a little study and application. But school plants are not just ordinary buildings. They must be planned with certain future curriculum requirements in view, which in turn must be based upon the philosophy of the community. A community's philosophy is very elusive. It is there all right in a sort of nebulous form in every community. The big problem is to get it solidified, crystallized, or organized into a form which can be simply stated.

Previous to 1946 a number of school systems in the United States had brought in parent and citizen advisory committees to help set up courses of study. Other schools had used custodians to check building plans. Still others received suggestions from teachers in the planning of schools. In some places the public filled out questionnaires concerning desirable features in school plants. Probably the most extensive community participation in school building planning took place at Orchard Park,[1] N. Y., a suburb of Buffalo. The purpose of this project was to awaken the Orchard Park citizens to their educational needs and help them marshal the town's resources behind a community sponsored program. For

*Associate Professor of Education, Indiana University; formerly Principal of the District, Orchard Park, N. Y., during the planning of the new junior-senior high school.

[1]See "Community Participation in School Building Planning," a Teachers College, Columbia University Doctoral Thesis by Paul W. Seagers.

a number of years Orchard Park had difficulty in voting any sizable school bond issues. In May, 1922, it failed to vote an issue for $50,000. In July of that year the $50,000 was carried. In 1930 the district failed to vote a $75,000 bond issue. Again in 1931 the school board asked the public to vote $75,000 for building purposes. The results of this request do not show up in the school board's minute book, so it is presumed that the resolution was lost or that the meeting was postponed.

Five years later, on May 28, 1935, the voters finally approved the $75,000 bond issue. To complicate matters, Orchard Park went through a consolidation program in 1944, had a change in school administration two years later, and was the scene of considerable non-industrial construction with 211 building permits in 1946.

Since then the average has been much greater. The estimated school plant needs totaled over a million and a half dollars. It was useless to attempt this extensive building program without the community carrying its fair share of the responsibility. A group of 22 outstanding citizens well distributed geographically and socioeconomically were selected by the board of education to act as an advisory committee. This group broken up into subcommittees studied the following questions:

What will Orchard Park be like in 1950?

What should education in Orchard Park be like in 1950?

What educational deficiencies are indicated in the school system as of the time of the report and how can the optimum of 1950 be reached?

All this study pointed to desperately needed facilities.

Plans were laid to get greater community co-operation for the planning of these facilities. It was thought desirable to get every available resource into this co-operative venture. This was a difficult undertaking — the professional literature provided few tested techniques. A pilot study was set up to determine the desirable methods for proceeding. Five techniques were selected and used as outlined below:

Technique No. 1. Selection

Two pupils, two parents, and the teacher were selected by each junior-senior high school home room. The citizens' advisory committee then checked to see if every recognized type of organization in the community was represented and that the representation was well distributed geographically and socioeconomically. Wherever there seemed to be vacancies, the board of education and the advisory committee filled them. After this nucleus for an over-all community committee had been established, notices were published in the press inviting all interested persons to participate. Although care was taken to see that there were participants from all recognized organizations, these people were informed that they were not functioning as representatives of those organizations, but rather as interested citizens in a co-operative process.

Paul W. Seagers, Ph.D.
Associate Professor of Education; School Planning and Building Consultant, Indiana University, Bloomington, Indiana.

Technique No. 2. Getting Background

In any community the pupils, parents, and teachers have not had enough experience in school building planning to be able to evaluate buildings well. To overcome this lack of knowledge we arranged that our committee members visit good school buildings in adjoining towns. Some of the trips were made by large groups of pupils, parents, and school employees in school buses. Some of these schools co-operated not only by displaying the school plant but by demonstrating the type of flexible program that could be had in the modern plant.

Books on school planning, pictures of good buildings, clippings, plans, and other materials were distributed to the children in the home rooms. One school office was equipped with materials and a drafting board. Many parts of the school program were focused on school facilities. In fact, the whole community tended to become school conscious. The architect, members of the board of education, and the principal of the school district made themselves available to groups in order to discuss principles of school planning and standards as well as how the school plant must fit the curriculum needs. This naturally led back into the courses of study and the community philosophy.

Technique No. 3. Fusing Pupils, Parents, and School Employees Into Committees

When pupils, parents, and teachers try to work together in committees, there frequently appear barriers which hamper good participation. In this particular case, 227 people greatly differing in age, experience, and education had to be fused into working committees. The school administration was much more accustomed to working with the school employees, so they together with the citizens' advisory committee selected 21 areas of inquiry for the co-operative study. The public was then given the opportunity of suggesting other areas and committees. As the first group to be informed the teachers were given background materials, were instructed and in other ways prepared to instruct and assimilate the next group into the committees. This second group was the pupils. The pupils then in turn instructed and helped to assimilate as the third group, their parents and other interested citizens. Where pupil-teacher-parent committees have functioned previously, this technique is not necessary. However, it is recommended very highly in communities in which co-operative planning is undertaken for the first time.

Technique No. 4. Instructing the Committees

As the reader may now conjecture, the actual application of these techniques is not as simple as might be inferred, for it may be necessary that several be applied simultaneously. Thus getting background and giving instructions can become a part of the whole fusion process. Even so, the more nearly we can isolate the techniques for descriptive purposes, the easier they are to understand. The committees were instructed by the board, the architect, and the principal of the school district in regard to such matters as (*a*) the duties and scope of the committees, (*b*) the procedures to follow in reporting their recommendations, (*c*) the function of the over-all citizens committee as an advisory group, (*d*) the place of the State Department of Education in a local school building program, (*e*) the board of education and its administrative officers in the project of co-operative planning. Everyone was made fully aware that the board of education was the duly elected body responsible for making final decisions and that all work of the committees was advisory. They were also told that all advisory reports would be given due consideration by the board.

Technique No. 5. Determining the Role of the Specialists

Although some people may not consider this a separate technique, the author feels it is important enough to mean failure or success in a program of co-operative planning. Frequently, the specialist feels that, with his technical knowledge, he should have the last word; he may be disgruntled easily when his advice is not followed exactly as given. On the other hand, the public may cater to the whims of a specialist, as a form of subservience to *bureaucracy* or disregard too much of his advice because of an innate hatred for bureaucratic tendencies. It must be fully understood that the public through its duly elected or appointed representatives is responsible for all final decisions and that the findings and advice of the specialist must be considered objectively in view of his training, successful experience, reputation, and vision. Teachers, supervisors, administrators,

consultants, architects, and engineers are all specialists.

To help the committees understand the need for experts, excerpts from David E. Lilienthal's book, *Democracy on the March*, were read. These explained very simply the role of the expert in democratic procedures.

The groups worked well together. The architect, the board of education, and the principal of the district co-operated well. The district superintendent of schools functioning as a representative of the State Department aided materially. An excellent community center junior-senior high school plan was evolved. The advisory committee recommended a referendum on July 8, 1947. The result was recorded in the board minutes as follows:

Resolution for erection of junior-senior high school not to exceed $1,375,000; 346 yes, 179 no; resolution was lost, because by law a two-thirds majority of those voting was needed for this bond issue.

Resolution for remodeling present high school for elementary purposes not to exceed $125,000; 377 yes, 41 no; resolution was carried.

These results did not bother the citizens. They only guessed wrong on the date. Too many people were away, due to summer vacations and the nearness of the Fourth of July. The next attempt was made after school opened in the fall; the pupils then were back ready for a real campaign. So we find this note in the board minutes:

September 9, 1947, Resolution for erection of a junior-senior high school not to exceed $1,375,000; 1,003 yes, 411 no; resolution was carried.

But prices had risen since June, so reading further in the minute book we find:

December 12, 1947, Resolution to meet increased cost of junior-senior high school building, $200,000; 453 yes, 105 no; resolution was carried.

On September 1, 1947, the principal of the district left Orchard Park to take a position with a midwest university. Despite the loss of the leadership which had initiated this comprehensive co-operative program, the co-operative effort was continued, as evidenced by the successful voting of the two succeeding bond referendums.

During the past year another bond issue resolution of $380,000 was voted successfully to build a large elementary school. This further attests to the desirability of this process. Let me repeat that this all took place in a rapidly growing suburb recently consolidated, reorganized, and enduring a change in administrative leadership. Extreme differences in professional, occupational, and economic status as well as many suspicions of the people in the village contributed to the difficulty in planning. By tapping the community resources, this community was able to recognize its needs. Better yet, it was able to recognize its collective strength and marshal that strength behind a unity of purpose. Once it was well under motion, even the initiating and motivating personalities could disappear with little or no retarding effect upon the ultimate result. It set the stage for a continuous public relations program.

The techniques mentioned above have now been tried in communities other than Orchard Park. Downers Grove, Ill., Mason City, Ia., and other cities can attest to their reliability when properly used. Many architects recognize their value and lend their wholehearted support. Administrators find them not only excellent for better community understanding but exceptionally good in helping teachers evaluate their teaching methods and procedures. Pupils have a greater realization of the value of school property and they are more likely to protect it.

Administrators have grown enormously in educational stature and leadership ability. But even more important than all of these outcomes is that in these days of bureaucratic tendencies and centralization of power in government, the grass root citizens will accept their responsibility to participate actively and constructively in affairs pertaining to public schools, the last real, militant bulwark of democracy. If our concept of democratic school administration is to reach maturity in practice, co-operative planning or tapping community resources in planning school buildings must of necessity assume a rather large and important role.

Desirable Principles for State School Building Aid*

O. E. Domian**

State aid for school building construction is a relatively recent development. Although school building aid has been provided by a few states over a period of years, the amount of aid in these first state programs was small and usually it was granted only for special situations. Missouri and Pennsylvania were the first states to offer state aid for school construction, each having established a limited plan in 1911. However, the major development and expansion of building aid programs has occurred during the past decade. By July, 1949, 22 states were providing some type of school building aid; 14 of these states have instituted their plans since 1944, with 10 of them beginning in 1947 or later. Several states have revised their original construction aid laws or have replaced them with completely new programs.

The state building aid plans differ widely in scope, in the qualifications set up for participation, and in the procedure for administration. The amount of aid ranges from mere token payments to as much as $55,000,000 in one year. Practically every state having building aid legislation has its own special plan for distributing aid. In a few states building aid has been included as part of the minimum foundation program. Some states have used school construction aid as an incentive for school district reorganization. Occasionally the administration of the aid plan has been assigned to a special board other than the state department of education. Because of the recency of state building aid, no established program pattern has yet been accepted. Wide differences are much more characteristic of the present programs than the similarities.

It was one of the objectives of a study made by the writer to develop a tentative set of principles on which state aid for school building construction might be based in the state of Minnesota.

In pursuit of this objective the principles embodied in present state laws covering school building aid were collected, then evaluated and following the evaluation a tentative set of principles for state school building aid was proposed for Minnesota. It is believed that the general method and conclusions reached will be of help to those in all states who are interested in the problem of meeting the school building crisis.

Principles Found in Present Laws

In the first step each state program for school building aid was carefully analyzed. The specific state aid laws and the explanatory material submitted by the state departments of education were examined. On the basis of such an analysis a statement of principles in effect in each state was prepared. The sets of principles thus formulated for the various states were then studied. By combining similar statements and by restating some in general terms it was possible to reduce the number to the following 39 major principles.

1. The administration of all phases of the state building aid program should be solely up to the State Department of Education.

*Adapted from the author's doctoral dissertation entitled *State-wide Problems in the Housing of Public Education Based on a Study of Conditions in Minnesota*, University of Minnesota, 1951.

**Director of the Bureau of Field Studies, University of Minnesota.

2. A state board should be established outside of the State Department of Education to administer the program of state aid for school buildings.

3. State aid for school buildings should be administered by a special board, separate and distinct from the State Department of Education. This board should have authority to approve or disapprove state allocations for school buildings after applications for aid by districts have been approved by the State Department of Education.

4. The plans and specifications for each proposed school building should be approved by the State Department of Education in order for the project to qualify for state building aid.

5. No district should be granted aid until its proposed building program has been approved by the State Board of Education as educationally and economically sound.

6. State building aid should be allocated only after a comprehensive study of the school district organization within a county and only to such districts as fit into a sound plan of district reorganization in the county.

7. State building aid should be used to encourage and foster the development of reorganized or consolidated community public schools by paying greater aid to such districts than to other districts in the State.

8. State building aid should be paid toward the construction of central school buildings on the basis of a fixed amount for each rural school abandoned.

9. State building aid should be paid only to districts which consolidate to form large school districts.

10. No state school building aid should be paid for new construction or rehabilitating existing buildings if the floor area thereby provided when added to the floor area of adequate school space already existing in the district provides a floor area per pupil in excess of the standard amount of floor area per pupil as established by law or by State Department of Education regulation.

11. State school building aid should be used only for rehabilitation of existing school plants.

12. Certain school facilities, such as gymnasium, lunchroom and teachers' home, should be excluded from qualifying for state building aid.

13. State school building aid should be paid for elementary school buildings only.

14. State school building aid should be paid only for establishment of special schools, such as regional vocational schools.

15. State building aid should be used for the purchase and improvement of sites, the purchase of built-in or fixed equipment, and the construction, reconstruction, alteration of and addition to existing school buildings.

16. No district should be granted school building aid unless it has levied the minimum tax rate prescribed by state law for school purposes.

17. No allocation for school building aid should be made to a district unless its existing bonded indebtedness exceeds a fixed percentage of the total amount permitted by state law.

18. State school building aid shall be paid only to districts having less than a fixed amount of wealth per pupil.

19. The board administering state building aid should have the authority to allocate such aid to impoverished districts which lack essential physical plant properties although they may be unable to meet the conditions set up as qualifications for aid.

20. State school building aid should be provided as outright grants in defense plant areas having acute school building needs.

21. After all capital outlay needs of a district, as approved by the State Department of Education, have been met, the districts should have the right to use funds received as state building aid for the payment of principal and interest on indebtedness incurred prior to the establishment of the state building aid plan.

22. State building aid should be paid to school districts on school projects constructed within recent years (the exact period to be fixed by law) previous to the enactment of the state building aid law, provided that the districts and the projects meet all the specifications as established for new projects.

23. Any state building aid not expended by the district within a certain period of time should revert to the State.

24. All construction work on school buildings which qualify for state building aid should be inspected and approved by the State Department of Education.

25. State building aid should be provided in the form of an advance to the district of the total cost of the building with the district making an annual repayment equal to the receipts from a fixed tax rate on the property in the district. That portion of the advance not repaid by the district out of such tax receipts within a prescribed number of years, as established as law, is canceled and thus becomes the state's contribution to the school building project.

26. State building aid should be paid, not as a lump sum, but annually for as many years as the district has issued bonds for the school building project.

27. State building aid should be paid to the district in the form of outright grants with no repayment of any kind by the district.

28. All state building aid should be paid on the basis of a fixed percentage of the cost of each approved school building project.

29. Part of the state building aid should be paid on the basis of a fixed percentage of the cost of each approved school building project.

30. All of the state building aid fund should be distributed equally among all school districts, regardless of size, enrollment, wealth, or need for school construction.

31. Part of the state building aid fund should be distributed equally among all school districts, regardless of size, enrollment, wealth, or need for school construction.

32. All state aid for school buildings should be distributed to districts in the form of equalization aid, based upon the financial ability of the districts.

33. Part of the state aid for school buildings should be distributed to districts in the form of equalization aid, based upon the financial ability of the districts.

34. State aid for capital outlay should be distributed as a part of the state minimum foundation program, whereby aid for capital outlay would be distributed to every district on the same basis as the aid for the minimum foundation program for instruction, and without regard to the status of the existing school plant or the school plant needs of the district.

35. State school building aid should be distributed to all school districts, with a portion of the fund distributed equally among all districts and the rest of the fund on the basis of school enrollments of the districts.

36. The amount of state building aid should not exceed a fixed amount per district.

37. The amount of state building aid should not exceed a fixed amount per pupil attending the school to be built.

38. State building aid should not exceed a fixed amount per classroom.

39. State school building aid should be distributed to all school districts, irrespective of school building needs, in proportion to the number of pupils in the district, using average daily membership, average daily attendance, or some other established measure of the number of pupils.

Evaluation of Principles

The second step in establishing the framework of a sound state building aid program consisted of evaluating the principles which underlie the existing building aid plans. The four groups of individuals selected to do the evaluating were: (*a*) the state commissioners of education, (*b*) professors of educational administration, (*c*) superintendents of schools, and (*d*) professors of political science. All of the groups were familiar with school finance but each group represented a somewhat different point of view toward it.

A questionnaire was submitted to each of the 264 persons included in the four groups. The letter of explanation requested that each of the 39 principles be evaluated separately as sound, questionable, or unsound. Because it did not seem possible to group the statements in a program pattern, evaluations were requested on each statement as a separate item.

The 164 completed questionnaires which were returned are included in the tabulations used in this study. Slightly more than two thirds of the 48 state commissioners of education (68.7 per cent) and of the 75 professors of education (67.2 per cent) returned the completed questionnaire. The response from the 61 superintendents of schools was almost as high; 64.0 per cent of the persons in this group completed the evaluation. The smallest response (52.5 per cent) was from the 80 professors of political science.

The evaluations of principles, as recorded on the completed questionnaires, were tabulated separately for each of the four selected groups. No single principle is rated as being sound or as being unsound by every individual in any one of the four groups. There is, however, considerable agreement within each group in regard to the evaluations given to most of the principles. For example, more than 60 per cent of the commissioners of education agree on ratings of sound for 14 principles and on ratings of unsound for 9 principles. There is a similar high degree of agreement within the other groups.

However, before accepting any principle as sound or unsound, it is necessary to determine the possibility of securing the actual distribution of evaluations by chance. With three ratings available for each principle, it could be expected that chance would divide the evaluations equally among the three possible ratings. The results from any one sam-

pling might however vary from this expectancy. It becomes necessary to select the level of significance which one is willing to accept. For this study the 1 per cent level of significance has been selected. Thus any valuation which shows a number of ratings greater than might be expected by chance in one time out of a hundred is accepted as being significant.

Applying the test of significance to the ratings of the 39 principles by the four groups makes it possible to classify each principle as "sound," "questionable," "unsound," or "no agreement" by the group. The classification of principles on this basis indicates a large amount of agreement among evaluators. For 28 of the 39 principles the same classification is given for each of the four groups. Of the 11 principles in which there are differences in classification, there is agreement among these three groups regarding seven principles and agreement between two groups regarding four principles. Only two principles were given three classifications each. Principle 17 is classified as "sound" by the superintendents, as "questionable" by the political scientists, and as "no agreement" by the other two groups. Principle 36 is classified as "unsound" by the professors of education, as "questionable" by the superintendents, and as "no agreement" by the other two groups. To visualize the grouping of the principles Table I has been prepared.

Principles Proposed for a Minnesota Law

This evaluation of principles may well aid in the development of an acceptable set of principles for the school building aid program in any state. The principles evaluated as being "sound," especially if so classified by all groups and by a large proportion of the persons in each group, could serve as the framework for the state's program. Also, the principles rated as "unsound" should not be used unless they can be justified because of unusual conditions. The principles rated as "questionable" or "no agreement" need to be examined individually to determine whether any of them is of value to a particular state.

However, the principles should not be accepted or rejected on the basis of this evaluation alone. Any set of principles needs to be measured against the conditions within the state to assure that the program will fit. It must be pointed out that all principles evaluated in this study are based upon present state laws; other principles not now embodied in existing programs might also prove to be desirable. The evaluations of the existing laws were made on the basis of single, isolated principles; when these principles are combined into a pattern for a program there may be some overlapping, some contradictions, and some aspects not sufficiently well covered.

In formulating a set of principles for a school building aid law for Minnesota first consideration is given to the ten principles (numbers 4, 5, 6, 7, 15, 16, 19, 23, 24, 27) which are rated as "sound" by each of the four groups of evaluators. Each principle has been checked against Minnesota school conditions to determine whether it might apply or not in this state because of unusual circumstances. No special problems have been encountered; therefore, the ten principles are accepted for the Minnesota program.

A careful reading of these ten principles indicates that they do not include any statement allocating responsibility for the administration of a state building aid program nor a complete plan of distributing state building aid funds. Adequate provision needs to be made for both of these aspects in a well-developed program.

TABLE 1. Principles of State Aid for School Buildings by Classifications and According to the Number of Groups Giving Each Classification

Number of Groups	*Principles Rated As*			
	Sound	*Unsound*	*Questionable*	*No Agreement*
4	4,5,6,7,15,16, 19,23,24,27	2,3,11,12,13, 14,30,31,39	10,25,26	9,21,28,29, 37,38
3	1,32		18	20,22,34,35
2	33		8	8,17,33,36
1	17	34,35,36	17,20,22,36	1,18,32

In the complete list of 39 principles the first three relate to the responsibility for administering the state building aid program. The first principle proposes that the administration should be assigned solely to the state department of education, the second that it be assigned to a state board outside of the state department of education, and the third provides for joint administration by a special state board and the state education department. The second and third principles are rated "unsound" by all four groups of evaluators. The first principle is rated "sound" by the commissioners of education, the professors of education, the superintendents of schools and by 42 per cent of the professors of political science. On the basis of these evaluations the most desirable procedure is to allocate the administration of the state building aid program solely to the state department of education. Such an arrangement agrees with Minnesota conditions. Thus principle 1 is accepted as part of the proposed Minnesota program.

A major problem in selecting the principles to be included in a proposed plan for Minnesota relates to the method of allocating state aid funds. The evaluation is accepted, as given by the four groups, that it is unsound to restrict the funds to provide certain types of facilities, such as elementary schools or special schools, and also that it is unsound to exclude certain facilities such as gymnasium or lunchroom from qualifying for aid. The evaluation, given by the four groups, that it is sound to provide state aid as outright grants is accepted. In general, there is no agreement among the evaluators as to the soundness of any restrictions which would limit the amount of aid per district, per classroom or per pupil. Thus such restrictions are not included in the proposals for Minnesota. All methods for distributing building aid, unless based upon specific school building needs, are excluded from the proposed program. Consequently, such plans as distributing building aid equally among all districts, including building aid as part of a state minimum foundation program, or distributing it among all districts in proportion to the number of their pupils, are rejected.

A twofold plan of allocating state aid funds for school buildings, based on principles 29 and 33, is proposed for Minnesota. It consists of distributing a portion of the aid on the basis of a fixed percentage of the cost of each approved project and the balance as equalization aid. Under this plan the state would contribute to every approved project; the actual per cent of the total cost of individual projects from state funds would vary on the basis of the wealth of the district.

Basing state aid for school buildings on the financial ability of the districts is rather generally approved by all four groups of evaluators. Principles 32 and 33, which state that all or part of the building aid should be distributed on an equalization basis, are rated as "sound" by a large percentage of all evaluators.

There is a difference of opinion in each group regarding aid on the basis of a fixed percentage of the cost of each approved project. Although principles 28 and 29, which state that all or part of the state aid should be paid on the basis of a fixed percentage of the cost of each project, are rated as "sound" by a substantial number of evaluators in each of the four groups, both principles have been classified as "no agreement" on the basis of the ratings.

This twofold plan of allocating state aid on the basis of a minimum per cent of the cost of each approved project plus additional amounts for the less wealthy districts is in accord with principles already in effect for school maintenance aids in the state. Minnesota provides basic state aid to every district on the basis of the number of pupils in attendance and varying amounts of equalization aid to the less wealthy districts to enable them to maintain minimum educational standards.

Thirteen Principles for Minnesota

Thus the following 13 principles are proposed as the framework for a program of state aid for school buildings in Minnesota:

1. The administration of all phases of the state building aid program should be assigned solely to the state department of education.

2. State building aid should be allocated only after a comprehensive study of the school district organization of the entire area and only to such districts as fit into a sound organizational plan which has been approved by the state department of education.

3. No district should be granted aid until its proposed building program has been approved by the state department of education as being educationally and economically sound.

4. The plans and specifications for each proposed school building should be approved by the state department of education in order for the project to qualify for state building aid.

5. State building aid should be used to encourage and foster the development of reorganized or consolidated community public schools by paying greater aid to

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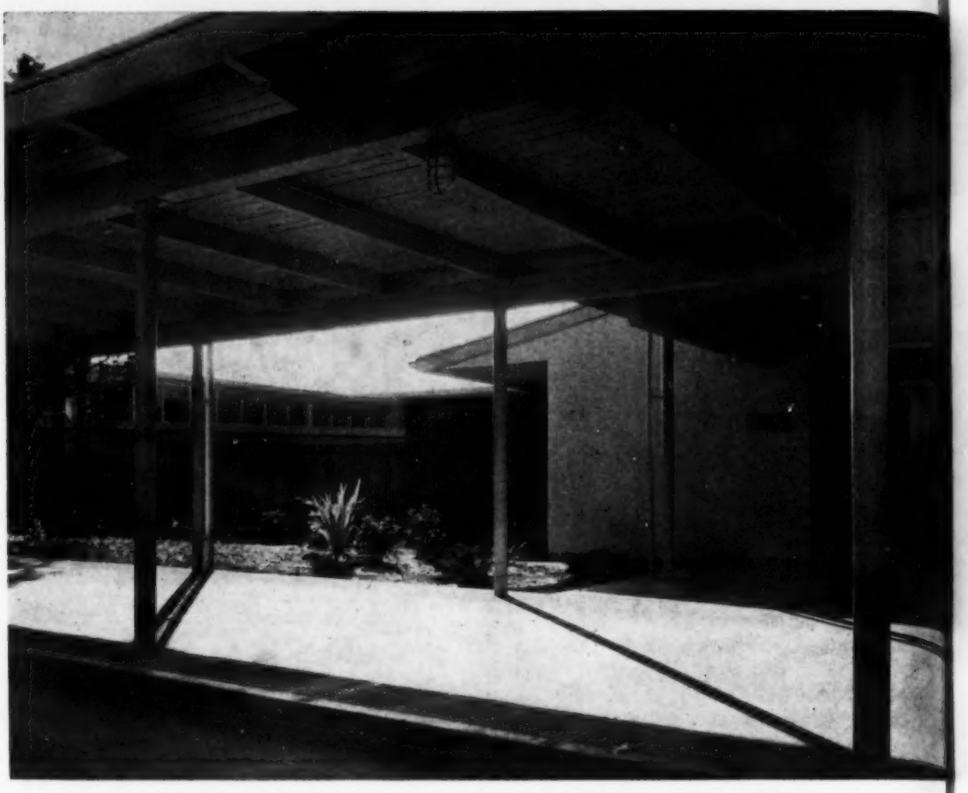
Elizabeth Smith Homemaking Building

Edwin D. Ettinger*



A patio view of the Elizabeth Smith Homemaking Building, Santa Maria Union High School, Santa Maria, California.

Declaring the Elizabeth Smith Homemaking Building of Santa Maria Union High School "the best adapted building in the nation for its purposes," Supt. H. E. Tyler also declared that "never again will we be able to secure a building of this type for the $138,000 the district is paying for it." The building is shaped like a huge letter "U" so planned that, as Dr. Tyler points out, it is really three buildings in one.

The north wing is designed for domestic science and homemaking, but as with the other two sections, the south and west wings, all arrangements are flexible. Cooking and other units are separated only by partitions no higher than the stoves, so that the supervisor can view all the student work while it is in progress. These units are located along the sides of the walls, with the center area available for classes. In one corner of the room are a fireplace and a large door and windows opening on the patio to the south. This arrangement permits a class in home furnishing to arrange a sitting room in various modes merely by changing the furniture and drapes.

There are five unit kitchens each in the north and south wings, each furnished in a different color, all colors in pastel. All fixtures are built in. The doors of drawers and closets alike are in birch veneer, finished in a plastic varnish that permits washing. There are no knobs or pulls of any type on any drawer or closet. Each door or drawer has a grooved bevel around the edge, which permits the fingers to get a grip on it for easy opening.

There is a dishwashing unit in each of the two wings, and in the south wing there is a child-care section with two complete bathrooms and an entrance onto the patio where

*Los Angeles, Calif.

A corner in the south wing where students are instructed in furniture arrangement.

Corner in the "living" room where instruction is given in furniture arrangement.

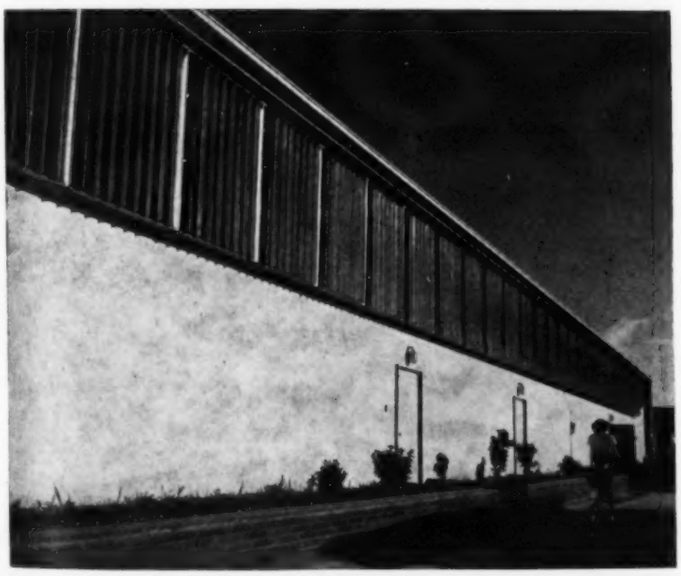
The clothing room in the west wing, Elizabeth Smith Homemaking Building.

babies may be placed in the sun. Adjoining, in this wing, is a closet and a roll-away bed, where girls may practice bedmaking.

A unique feature in both units is what the painter describes as a feat of "squaring a circle." All corner shelves are circular so that a gentle touch on the door causes the shelves to swing outward. There is also a revolving set of circular shelves in a nature color located in the south wing.

All drainboards in the kitchen units are finished with plastic tops, such as modern commercial lunch counters are now using. Worktables in the kitchen units have similarly finished tops.

The wing across the west end of the other two areas is designed for crafts and sewing. The south half which is for crafts, has a



Southwest side of Elizabeth Smith Homemaking Building. Vertical louvers are set above windows to prevent direct rays of hot sun from entering the building.

Laundry work is made attractive with both gas and electric appliances.

A revolving corner cupboard, one of the features of the cooking units.

large storage room at the end, where materials used during the day may be stored to enable night classes to use the main section and vice versa. Furniture upholstering, rugmaking, and the operation of hand- and foot-power looms are featured in this room. The entire wing, having east and west exposures along its sides, is lighted with large windows across the top. These windows are covered with louvers to break the direct sunlight.

The north end of this room is for sewing. The machines have been located about the walls, and the cutting tables are in the center, where classes may also be assembled

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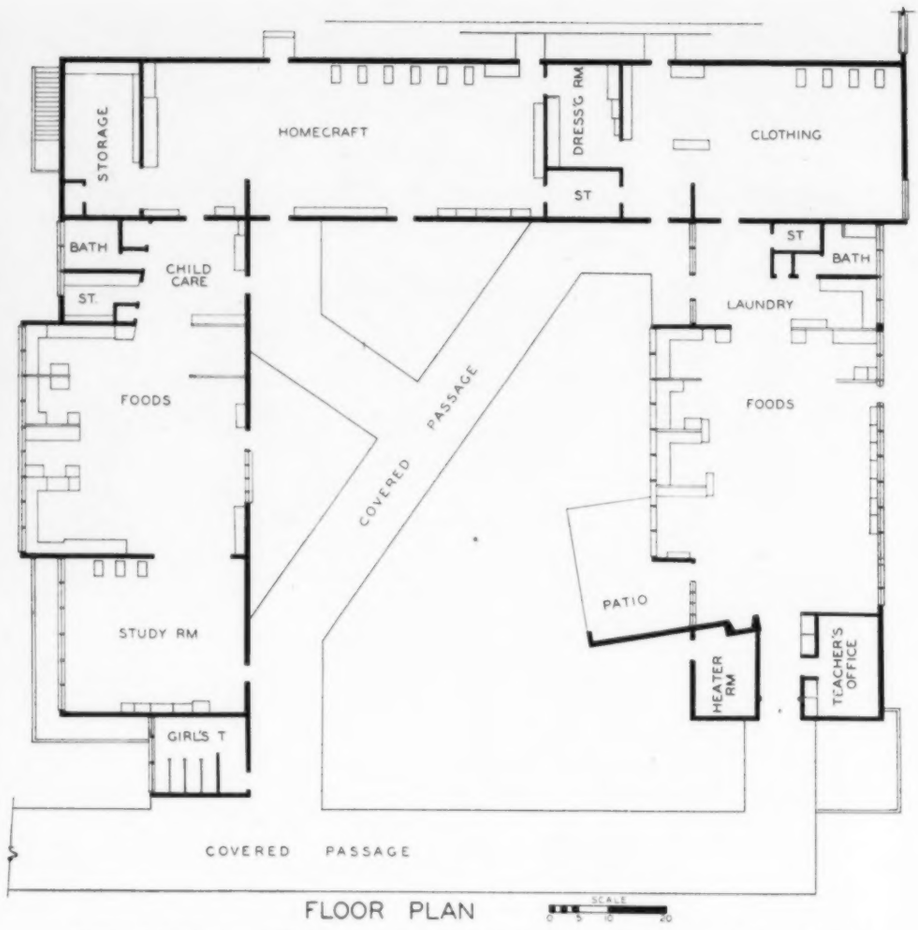


Floor Plan of the Elizabeth Smith Homemaking Building, Santa Maria Union High School, Santa Maria, California. Daniel, Mann, Johnson, and Mendenhall, Architects, Los Angeles.

(Left) The separate kitchen units are separated by low partitions which enable the instructor to view the entire area. Counter materials are various types of finishes used in modern homes. (Right) Classrooms separated by folding doors.

Planning the Art Suite for Junior High Schools

N. L. Engelhardt, Sr. and Doris McMillan***

San Francisco junior high schools pride themselves on the art work of their pupils. And rightly so. The children have a fine legacy from their forefathers of many races and their pride therein is reflected in the art work done under the skillful guidance of their teachers. In planning four new junior high schools for the city, recognition is given this accomplishment of the older schools and care has been given to provide the facilities teachers and supervisors find essential.

The planning of new spaces has enlisted the thinking and services of administrators and supervisors, teachers, and specialists. A 1950 summer workshop was held; a committee was the outgrowth. Questionnaires with pertinent questions went to all junior and senior high school art teachers. A special meeting on materials, especially the noncritical, brought out important points. In other meetings details of space arrangements, storage areas, nature and location of equipment were discussed and related to space provisions in the new schools. Planned layouts were discussed and revised and final decisions reached.

*Engelhardt, Engelhardt and Leggett, Educational Consultants, New York City.
**Supervisor of Art, San Francisco Unified School District, retired June 30, 1951.

It was recognized that the planning of new schools offered opportunity for curriculum revisions and for further integration of the art work with the homemaking arts, the homecrafts, and the industrial arts, as well as other subject matter areas of the junior high school program. In no sense was it felt that curriculum patterns were being established for all time, but that the impetus was here given for continuous curriculum development.

The four junior high schools involved in the planning are:

Herbert Hoover Junior High School — Kump Associates, Architects
Giannini Junior High School — Thomsen and Wilson, Architects
Luther Burbank Junior High School — Gardner Dailey, Architect
Benjamin Franklin Junior High School — Bliss and Hurt, Trudell and Berger, Architects

The schools are destined to carry an enrollment of 1200 each, considered as the optimum for San Francisco. There has been careful relationship of the architects' plans to sites and wide variations in general layout as outcomes of freedom in architectural expression. The architects themselves have attended the early planning discussions and drawn many layouts for discussion and final approval.

The Art Suite

The art suite, decided upon as the final layout, divides itself into three major spaces; namely, two general art rooms with an art activity room between. The over-all length of space required is 156 feet — 52 ft. for each general room and for the activity room. Variations, to be sure, have been made in the four buildings to adjust to widths of those spaces. The general relationship is shown in Diagram I, which represents the results of one stage of the planning.

FINAL DESCRIPTION OF THE GENERAL ART ROOMS

The committee, after its many meetings, arrived at this final description of the general art rooms:

The General Art Room should approximate 30 by 52 ft.

Spaces

At front of room, west end, the entire wall from baseboard to ceiling should be covered with tackboard, and the wall should be furred

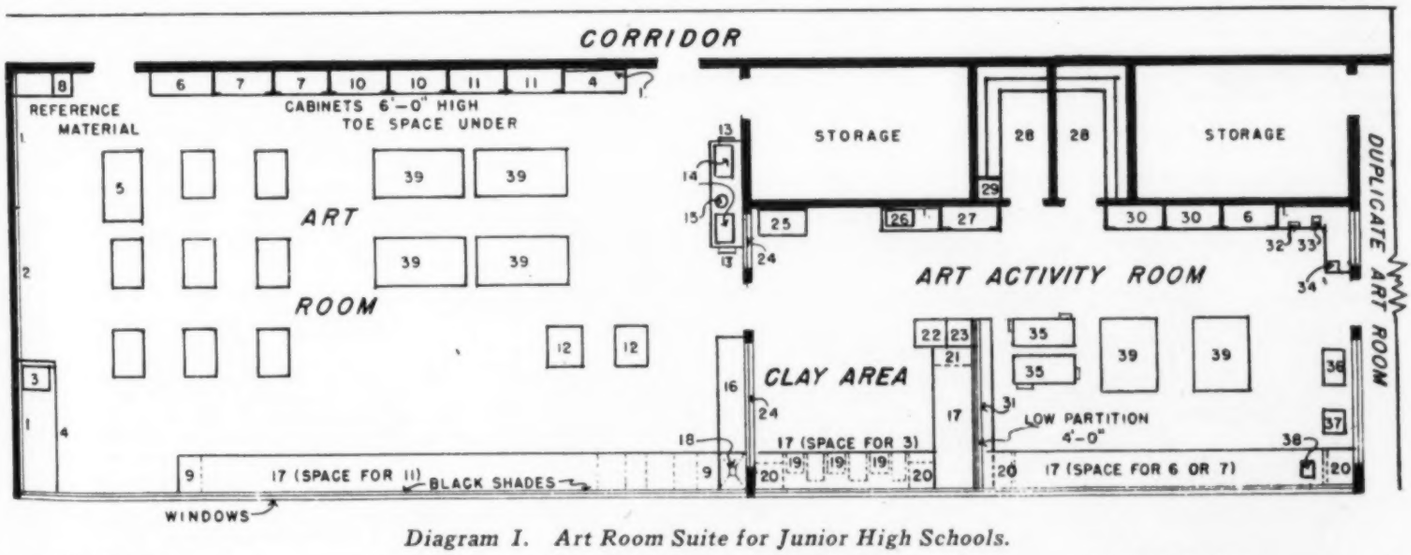


Diagram I. Art Room Suite for Junior High Schools.

1. Tackboard
2. Chalkboard
3. Paper cutter
4. Counter
5. Teacher's desk
6. Display cabinet
7. Supply cabinet
8. File
9. Drawers under
10. Tote drawers
11. Smock cabinets, shelf & rod
12. Floor looms
13. Towels
14. Clay trap
15. Waste Disposal
16. Weaving storage
17. Knee hole work bench
18. Bin
19. Clay bins
20. Tool drawers
21. Bats
22. Wedging board
23. Wet clay
24. Clear glass
25. Kiln
26. Sink
27. Green
28. Bisque & dry storage
29. Kiln parts
30. Tool storage cabinet
31. Reeded glass
32. Grinder & buffer
33. Beverly bench shear
34. Jig saw
35. Wood working benches
36. 32" square cutting shears
37. Movable anvil
38. Drill press
39. Table

out approximately 8 in. from height of 7 ft. from floor. Behind this area would be housed:

1. Vertical rising screen
2. Vertical rising chalkboard
3. Drying arrangement for wet posters and large work. Two racks 6 in. by 3 ft. long of 4 longitudinal metal bars equipped with clips.

Across the front of the room there should be a raised platform 9 in. high, 30 in. deep, and 25 ft. 6 in. long from windows. This platform should contain large storage drawers below. Three of these would be 3 in. high, 30 in. deep and 4 ft. 0 in. long, and four would be 3 in. high, 30 in. deep, and 3 ft. 0 in. long. This platform would also be used as a model stand or for other activities.

North Side

Beginning at front of room to double door there should be placed the teacher's reference files:

1 standard metal filing cabinet 18 by 28 by 52 in.
1 with door and tote tray type of shelf, 18 by 28 by 52 in. high
1 large tote drawer cabinet 28 in. deep by 36 in. long by 36 in. high. (Refer to Sheldon Catalog "Art-Studio Workshop Furniture," page R-22 cabinet #r-132-W)

Between the double door and single one there should be placed a series 20 in. deep cabinets in the following order:

1 — 6 ft. long for 2 sections of 30 tote drawers
1 — 3 ft. long for smocks
1 — 3 ft. long for 1 set of 30 tote drawers
1 — 2 ft. 6 in. long for glass display cabinet
1 — 3 ft. long for supplies
1 — 6 ft. long for 2 sections of 30 tote drawers

On wall against adult storage should be a series of 18-in. cabinets in the following order:

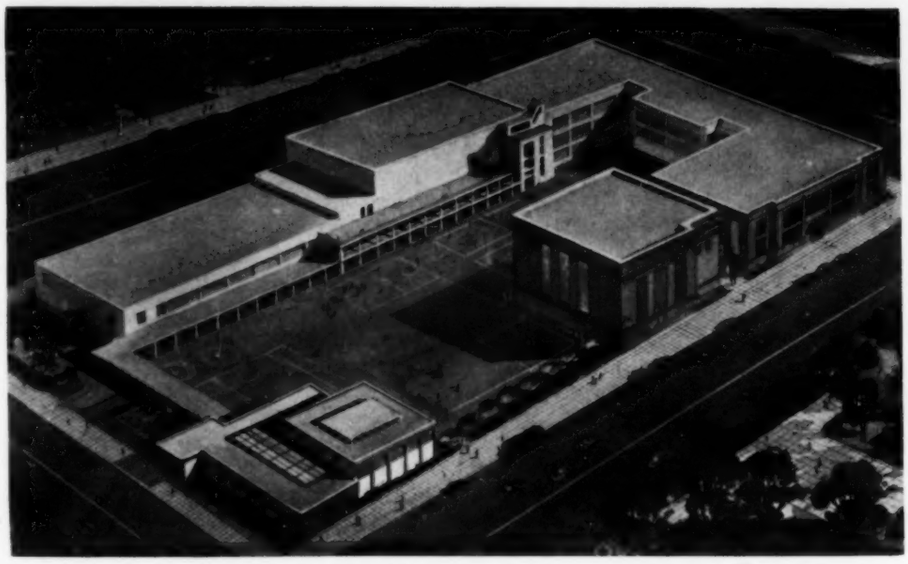
1 — 18 by 18-in. for mops
1 — 18 by 18-in. for brooms
1 — 18 by 24-in. for small supplies
1 — 18 by 24-in. for teacher's coat

East End

Teacher's desk built in against glass partition, equipped with swivel chair, type used in our cafeterias.

Storage cabinets, counter type, 30 in. high by 20 in. deep, double door, adjustable shelves, to be placed under clear glass partition from door to windows.

Free standing sink, 5 ft. 6 in. long, 2 ft. wide, equipped with hot and cold water, clay trap; storage space below. Drainboard end to be equipped with slots for towel disposal; large wastebasket enclosed; towel rack at end.



Perspective, Benjamin Franklin Junior High School, San Francisco, California. — Bliss and Hurt, Trudell and Berger, Architects, San Francisco.

South Side

A series of 10 knee-hole benches to be placed under windows. A swivel ironing board to be hung at end of bench nearest the activity room; sewing machine to be kept underneath, protected from dust by doors. It may be necessary to increase height of this unit both for storage of the sewing machine and for comfort in ironing. The 20 in. wide counter from this unit to glass partition should be a continuation of the one under the partition.

Drawing boards to be stored horizontally at extreme west end or front of room. This should be at least 60 in. high.

General Suggestions

Space for broom; space for mop
Space for drying rags
Space for wet posters
Overhead lights above tackboard

Teacher's swivel chair, built-in desk, located near art activity room; allow teacher to face at any angle for better supervision

At least one set of double doors to allow easy removal of stage sets and other large projects

Swivel ironing board

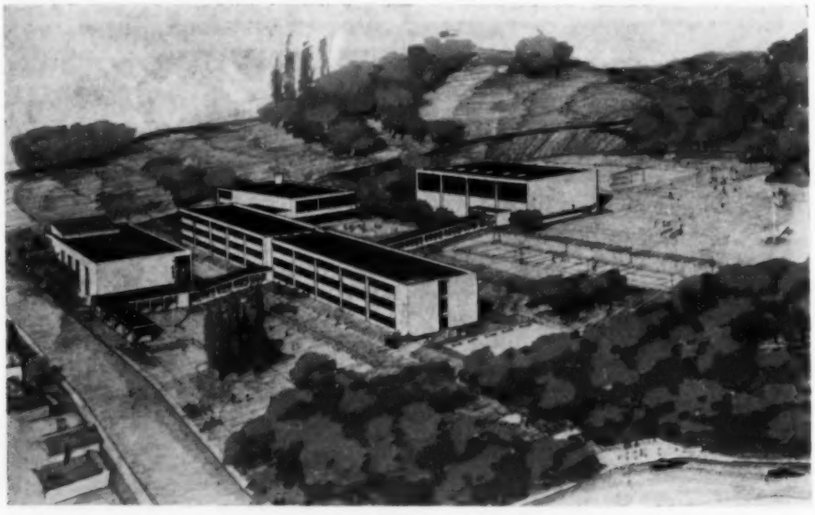
Space under workbench with doors for storage of sewing machine

One or more fire extinguishers for each art activity room

Drawing boards should be stored horizontally to lessen spoilage of paintings by running

Six sturdy tables 4 by 6 ft. be provided for each general art room. In addition to these, there should be at least six individual art desks, both of these to be designed by the committee next year. Gas and compressed air to be led into every art activity room

Zinc covered board, approximately 24 by 36 in. for cutting leather



Perspective, Luther Burbank Junior High School, San Francisco, California. — Gardner A. Dailey, F.A.I.A. and Associates, Architects, San Francisco.

The Art Activity Room

The committee recommended that the art activity room have a size of approximately that of the general art room, with clear glass at each end to permit overview from the general art room.

A. In the space arrangement it was suggested:

That one side of the room be reserved for storage. This area, 8 ft. wide, is to be broken into:

1. Adult storage with access from and placed at end of each general art room, 8 by 8 ft.
2. Two spaces, 8 by 9 ft. 6 in., in center portion. Each of these should hold an electric kiln, one for adult and one for day school. These two spaces should be equipped with folding doors that can be locked when not in use. Between the spaces at front, a spray booth with electric blower should be located. A ventilator blower should be placed at back end of the space.
3. Art storage: 8 by 12 ft., accessible to art activity room, equipped with adequate shelving to hold all sizes of paper. Also a tier of small shelves or drawers for small articles. This space should be provided with lock.
4. There should be a glass enclosed power-tool room, 9 by 15 ft., at east end of room against storage wall which would contain buffer, grinder, jig saw, square cutting shears, drill press, etc., and which would be equipped with glass door and lock. The committee felt this would be a

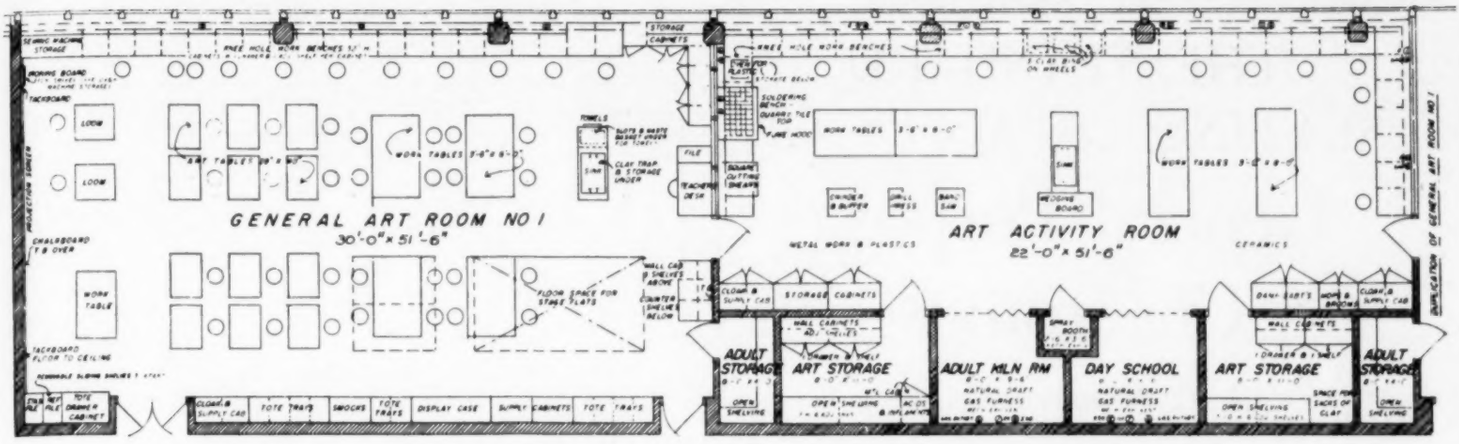


Diagram II. Junior High School Provision for the Fine Arts with Large Activity Room.

safety precaution, especially in certain neighborhoods and with certain types of children.

B. The equipment should include:

1. Free standing sink with wedging board attached at a "T." Space beneath for storage of bats.
2. Knee-hole benches under windows and along one end of room.
3. Clay storage under center section of knee-hole bench unit. These bins, approximately 18 by 18 by 24 in., to be of roll-away type, zinc or any rust-proof metal lined.
4. Knee-hole benches to be placed along one side, outside of tool room.
5. Damp cabinet to be placed between sink door and glass partition, 18 in. by 5 ft. 0 in., divided into two double door cabinets, with adjustable shelves made of heavy rustproof industrial mesh. Cabinet to be lined in zinc.
6. Space under windows should be provided for 3-ft. soldering area. It would be part of the knee-hole bench space, to be covered with quarry tile and provided with fume hood. It would be equipped with compressed air, gas and electric outlets. Next to this area would be the plastic working area with space for small electric oven.
7. Storage space overhead at each end of room, beginning at top of glass partition, approximately 6 ft. by 6 in.

C. Movable furniture would consist of:

One woodwork bench
Two large sturdy tables, welded fiber tops
One movable anvil

D. The required utilities should consist of:

Compressed air
220 and 110 outlets in power-tool room
110 outlets for every two knee-hole benches
Gas outlets for every two knee-hole benches
Sinks equipped with hot and cold water, clay traps
All sinks to be free-standing type

General Recommendations

The committee strongly recommends the combination of the general art rooms with an art activity room between. They also wish to recommend that overhead storage space be provided wherever possible, especially at each end of activity room and ends of general art rooms that join the activity room.

The committee, in recommending the glass enclosed tool room, did so as a safety measure. This is a debatable thing and should be given further consideration.

Committee Uses Questionnaire Results

This committee on Exploration of Art Room Arrangement, Supplies and Equipment had the following personnel: Neal George, *chairman;* Floyd Bowling, Mrs. Mathilda C. Cameron, John Gill, Leslie Klepper, Mrs. Glory Dail Koehler, Arthur St. Peter, Miss Mary Schnitzius, Miss Jean Thompson, August Tiesselinck, Miss Doris A. McMillan, *adviser and supervisor of art education.*

The results of the questionnaire, sent to all art teachers of the city schools, were carefully gleaned for help in the planning. The suggestions were many and a review of the following excerpts will show the influence of many teachers on the final planning results:

A large sink, with many faucets, where many students could be sent to clean their paint dishes, brushes, etc., at one time. Large art rooms, plenty of storage room (under lock and key).

Sinks in both rooms, with hot and cold water; several electric outlets in workshop.

Twenty-inch depth for supply cabinets seems just short of necessary. I would prefer 26-in. depth.

Re clay bins, could they be sectioned and opening from top? Then, when it is nearly used up, a top section would be removed, turning the 30-in. depth into a lesser depth which would be easier to reach into.

In ceramics, it is economical to have both a large and small kiln.

Individual tables are most efficient and should be used with large working tables also.

Most art rooms I've seen lacked bulletin space that is at eye level.

Storage space is greatly needed for supplies.

Art rooms should have a screen right in room. It should be equipped to show visual aids.

Additional space as tote drawers in tables. Cases really needed to exhibit. Gas plates for heating; electric plugs needed. Wash basins convenient, possibly more than one in each room.

If ceramics room had a concrete floor sloping to one corner it would be easier to clean and keep the janitor happy.

Ceramics drying room cabinets would be better with metal shelving rather than the metal covered wood which warps in due time. More cabinet space. Both gas and electric kilns have their faults; the gas kiln needs less repair but is more work for the teacher.

More and more storage space. Desks that are light enough to move to take care of sketching, etc. Large open area to be used for painting demonstrations, etc., and for sketching.

A place for art committees to work on scenery where they have ample space and do not interfere with regular class work; possibly a glass partition at one end of the art room.

Scaffolding and a place for painting stage scenery — possibly this could be arranged.

Individual art desks can be of two types; one for lettering and commercial art, stationary, and with a tilting top, and the other type an easel desk for figure sketching.

Could use a few easels in a room; a movable chalkboard with a display board on rear side; display case along with a display board; deep sinks like wash trays.

For leather, one large hardwood cutting table would be good. For files, some should be large and horizontal for matted pictures.

A lot of exhibit and pinning space. More chalkboard areas; showcases for display of art work in room and school halls for crafts. Easel for oil painting; large rooms, large tables. If possible, a separate art library in one of art rooms for reference; tables actually set up for professional type of silk-screen on yardage. A table equipped with surface for wedging and working clay.

Where you store paper or drawing boards (anything flat), have a hinged door on the drawer in front, such as the broiler on a stove. It pulls down and out of the way of movable flat things.

Have a supply cabinet for each person's supplies; e.g., brushes, pencils, etc., which can be locked and not used by any other period.

Be sure to have a clock in each room connected to the office clock so that the teacher can call clean-up time in some relation to the time the bells will ring.

Have plenty of pin-up space for exhibits.

Small drawers in desks are used for wastepaper baskets rather than supply drawers. It is better to keep the supply drawers away from the tables.

One long sink with several faucets and several paper towel boxes; a few built-in shelves for books; plenty of pinning space within reach of students.

More pinning space above chalkboards and on wall sections between windows; also, above all, windows and doors; built-in display cabinets; good lighting system.

A locked glass display case would be desirable in a room.

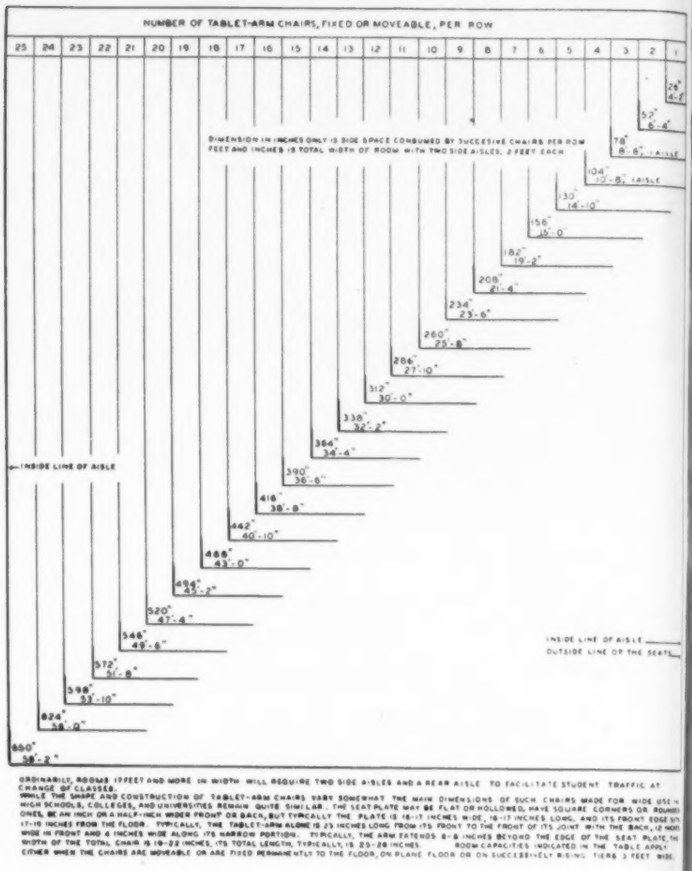
The Final Space Arrangement

With school building costs in San Francisco rising to $20 a square foot as happened in the spring of 1951, and with stated appropriations available for each school, the architects have made every possible adjustment to include within their total building the professional requirements of each school department. The final space layout for art as incorporated in the preliminary plans of the Giannini Junior High School is shown in Diagram II. The plans are a good example of how educational planner and architect, teachers, principals, and supervisors can work together in arriving at a satisfactory solution of their common problems. It takes time and a co-operative spirit to produce the result.

THE STANDARD SEATING CAPACITY OF General-Purpose Classrooms

*A. C. Lambert, Ph.D.**

DIMENSIONS OF A GENERAL-PURPOSE CLASSROOM EQUIPPED WITH TABLET-ARM CHAIRS



The present article reports a technique for determining the student-station capacity of general-purpose classrooms in secondary schools, colleges, and universities. The writer has found this technique useful in analyzing the degree to which instructional space is being utilized in given school plants and in projecting amounts of new space required to house specified programs of instruction.

A table is shown from which one can read the standard student-station capacity of general-purpose classrooms of any reasonable size and ordinary floor dimensions. One can also read the size and the probable floor dimensions required for classrooms which are to house classes of specified size, or specified ranges in size.

Can Room Capacity Be Standardized?

The idea of a standard or normal capacity of a classroom is still a basic idea. It has been with us a long time, but full agreement has not been reached on the "correct" amount of floor area required normally for a student station. The writer realizes the hazards in proposing a standard in this area. But there are times when administrators and budget makers simply have to make dependable estimates of the degree to which school and college and university plants are being utilized to *capacity*, and there are times when the capacity needed in a school plant has to be formulated in terms that are more than opinion "of local residents." The standard of capacity reported here and the technique for getting at it may serve a useful purpose. It carries no claim to perfection, but in practice it has proved useful for both analytical purposes and practical administration.

Limited to General-Purpose Rooms

This discussion of a standard student station is restricted to general-purpose classrooms. Such rooms are the most common rooms in school plants, and the most widely used. To handle these rooms as a general case may eventually simplify standardization of a student station in more complex rooms.

A general-purpose classroom is one which can be used conveniently for many kinds of general classroom work such as lectures, recitations, discussions, demonstrations, seminars, conferences, consultations, reports, and study. It is a room planned for instructional purposes which is largely or totally bare of specialized apparatus and equipment. For example, it is clear of such things as homemaking kitchens, or looms, or lathes, or cots, or fixed drawing easels, or numerous stacks of display cases and storage cabinets. It is a room seated commonly with utilitarian seats, either movable or bolted to the floor permanently.

Use of Tablet-Arm Chairs

The general-purpose classroom may be seated with desks, or chairs, or tables and chairs. Perhaps the most common form of seating now used in such rooms is the tablet-arm chair. This chair is the seating unit used finally by the writer to standardize the seating capacity of general-purpose classrooms.

Ordinary Chairs and Tables and Chairs

Loose ordinary chairs are probably the second most used type of seating in general classrooms. The analysis of room capacity reported in this article will fit this type of seating for ordinary purposes. It does not apply when small folding chairs are jammed into rooms for temporary seating of exceptionally large groups which may be packed into rooms for conventions, convocations, celebrations, etc. But even for these conditions, the normal room capacity provides the starting point from which housing committees may estimate room capacities for particular needs.

The student-station capacities reported here will be a little different when tables and ordinary chairs are insisted upon and are used. Capacity will then depend upon particular widths and lengths of tables, and upon the use of chairs on one side or on two or more sides of the tables. No lists of room capacities are reported here for installations of tables and chairs. When specific dimensions of the tables to be used are known, room capacities can be determined rather accurately. As a very rough statement, the student-station capacity of classrooms seated with tables and ordinary chairs will run from about one-half to three-fourths the capacity available when tablet-arm chairs are used.

Defining Areas and Stations

There can be more than one definition of the floor area of a classroom. It can be a gross area obtained by multiplying the full length of the floor inside by the full width of the floor inside. Or, it can be that free floor area which remains after there has been subtracted from the gross area the total square feet consumed by whatever series of lockers, enclosed ducts, heavy apparatus, and permanent bookcases and cabinets occupy space on the floor. In this article the floor area is handled as described below.

Under some circumstances a student station can be defined as the total facilities required to accommodate one person at one time. But it can also be defined in a more restricted sense as a chair or stool or a seat of one kind or another present in a room and available for a student to sit upon, or it is a clearly established place for a student to

*Professor of Educational Administration, Brigham Young University, 1934–50; currently Professor of Education, the Los Angeles State College of Applied Arts and Sciences.

THE STUDENT-STATION CAPACITY OF A GENERAL-PURPOSE CLASSROOM OF VARYING DIMENSIONS EQUIPPED WITH TABLET-ARM CHAIRS OR WITH OTHER SIMILAR SEATS

UNIFORMLY, 10 FEET OF FREE SPACE IS LEFT AT THE FRONT OF THE ROOM, INCLUDING THE FIRST ROW OF SEATS. THE ROWS ARE 3 FEET APART. A 2-FOOT AISLE IS LEFT ON EACH SIDE OF THE ROOM.

TOTAL RM-WIDTH: 1 AISLE	2 AISLES	TOTAL RM-LENGTH	10	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	45	46	49	52	55	58	61	64	67	70	73	76	79	82	85
		ROWS OF SEATS	1	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	8	8	8	9	9	9	10	10	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
		SEATS PER ROW: 1		S		T		U		D		E		N		T		S		T		A		T		I		O		N		C	A		P		A		C		I		T		Y	
		ROWS→1	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	8	8	8	9	9	9	10	10	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
4'-2"																																																
6'-4"		2		2		4		6		8		10		12		14		16								18		18				20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50
8'-6"		3		3		6		9		12		15		18		21		24								27		27				30	33	36	39	42	45	48	51	54	57	60	63	66	69	72	75
10'-8"	12'-8"	4		4		8		12		16		20		24		28		32								36		36				40	44	48	52	56	60	64	68	72	76	80	84	88	92	96	100
12'-10"	14'-10"	5		5		10		15		20		25		30		35		40								45		45				50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
15'-0"	17'-0"	6		6		12		18		24		30		36		42		48								54		54				60	66	72	78	84	90	96	102	108	114	120	126	132	138	144	150
17'-2"	19'-2"	7		7		14		21		28		35		42		49		56								63		63				70	77	84	91	98	105	112	119	126	133	140	147	154	161	168	175
	21'-4"	8		8		16		24		32		40		48		56		64								72		72				80	88	96	104	112	120	128	136	144	152	160	168	176	184	192	200
	23'-6"	9		9		18		27		36		45		54		63		72								81		81				90	99	108	117	126	135	144	153	162	171	180	189	198	207	216	225
	25'-8"	10		10		20		30		40		50		60		70		80								90		90				100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250
	27'-10"	11		11		22		33		44		55		66		77		88								99		99				110	121	132	143	154	165	176	187	198	209	220	231	242	253	264	
	30'-0"	12		12		24		36		48		60		72		84		96								108		108				120	132	144	156	168	180	192	204	216	228	240	252	264	276		
	32'-2"	13		13		26		39		52		65		78		91		104								117		117				130	143	156	169	182	195	208	221	234	247	260	273	286			
	34'-4"	14		14		28		42		56		70		84		98		112								126		126				140	154	168	182	196	210	224	238	252	266	280	294				
	36'-6"	15		15		30		45		60		75		90		105		120								135		135				150	165	180	195	210	225	240	255	270	285	300					
	38'-8"	16		16		32		48		64		80		96		112		128								144		144				160	176	192	208	224	240	256	272	288	304						
	40'-10"	17		17		34		51		68		85		102		119		136								153		153				170	187	204	221	238	255	272	289	306							
	43'-0"	18		18		36		54		72		90		108		126		144								162		162				180	198	216	234	252	270	288	306								
	45'-2"	19		19		38		57		76		95		114		133		152								171		171				190	209	228	247	266	285	304									
	47'-4"	20		20		40		60		80		100		120		140		160								180		180				200	220	240	260	280	300									
	49'-6"	21		21		42		63		84		105		126		147		168								189		189				210	231	252	273	294										
	51'-8"	22		22		44		66		88		110		132		154		176								198		198				220	242	264	286											
	53'-10"	23		23		46		69		92		115		138		161		184								207		207				230	253	276												
	56'-0"	24		24		48		72		96		120		144		168		192								216		216				240	264	288												
	58'-2"	25		25		50		75		100		125		150		175		200								225		225				250	275	300												

* REDUCES THE FREE SPACE AT FRONT OF ROOM ONE FOOT.
** LEAVES A REAR AISLE OF ONE FOOT.

† PLUS A REAR AISLE OF ONE FOOT. ‡ LEAVES A REAR AISLE OF TWO FEET. § LEAVES A REAR AISLE OF THREE FEET. ¶ REDUCES THE FREE SPACE AT THE FRONT OF THE ROOM.
§ FROM A ROOM LENGTH OF 43 FEET UPWARD A 3-FOOT REAR AISLE IS PROVIDED. WHERE THE INDICATED NUMBER OF ROWS OCCURS AT SOME INTERMEDIATE LENGTH WITHIN THE FULL THREE FEET REQUIRED FOR A ROW, EITHER THE REAR AISLE OR THE FREE SPACE AT THE FRONT OF THE ROOM WILL BE REDUCED ONE OR TWO FEET.
IF SIDE AISLES 3 FEET WIDE ARE DEMANDED ADD 2 FEET TO THE GIVEN ROOM WIDTH AND READ ACCORDINGLY. IF AN ADDITIONAL CENTER AISLE, EITHER 2 FEET OR 3 FEET WIDE, IS REQUIRED SUBTRACT ONE SEAT PER ROW.

THE TABLE ALSO INDICATES THE DIMENSIONS OF GENERAL-PURPOSE CLASSROOMS REQUIRED TO ACCOMMODATE CLASSES OF GIVEN SIZE.

work at a bench or a drawing stand, desk, or table. In general-purpose classrooms a student station most commonly means a chair or similar seat.

The Technique Reported Here

The technique reported here does *not* divide the classroom into so many square feet per student station, but it focuses attention upon that portion of the floor where seats will normally and expectably be placed. This is done by subtracting out a specified space at the front of the room for a teacher's space, by allowing an adequate aisle on each side of small rooms, and on three sides and in the middle of large rooms.

The space left at the front of the room is uniformly a 10-foot strip, which includes the first row of seats. It is assumed that the front is ordinarily across the short dimension of rectangular rooms. This space provides for a variety of class activities and for a variety of teaching practices at the hands of the numerous teachers who will eventually use any general-purpose classroom. It allows for the presence of a teacher's desk or a demonstration table, and/or for a platform. Rear and side aisles which are allowed under specified conditions permit necessary, convenient, and reasonably rapid pupil traffic. They permit both teachers and students to utilize blackboards or other instructional facilities which may be placed on the walls. Within the total floor space which is subtracted there is enough space also for a teacher's locker, or a storage cabinet, or a bookcase within the room itself, if necessary.

It is obvious that whatever additional amounts of floor area are consumed in actual classrooms by unusual installations of equipment will reduce the student-station capacities reported in this article. The amount of reduction will be approximately one station for each additional 6.5 square feet consumed.

Validating These Allowances

While these allowances might, on first glance, seem to be subjective and arbitrary, they are the result of many years' observation and analysis of classrooms, accompanied by many years' practical experience in scheduling classes in small and large secondary schools and in colleges and universities. To remove them somewhat from the realm of testimony simply, they have been referred to the judgment of many practicing classroom teachers. A certain technique which is sometimes used in educational circles to validate a criterion in areas of judgment by adding numerically the verbal responses made by "competent judges" to a mimeographed or printed questionnaire or opinion-air has not been used. Actual practice appears to substantiate the general reasonableness of these allowances. The specific amounts allowed can be varied somewhat without changing the reported capacities very much and without in any way changing the primary technique that is used.

A general principle of the technique reported here is first of all *not* to divide the total floor area into allotments of so many square feet per student. With attention centered upon that portion of the floor which actually carries seats, tablet-arm chairs are then spaced within that area, in rows, and the distance per student station sideways is standardized at 26 inches, and the distance between the rows is standardized at 36 inches. By a procedure shown in the chart and table the number of seats per row and the number of rows per room is determined and is listed for rooms of all ordinary and reasonable sizes and dimensions.

The critical distance of 26 inches sideways per student station was derived inductively by measuring and tabulating the several dimensions of more than a score of kinds and makes of tablet-arm chairs found in wide use, and by setting typical tablet-arm chairs at different distances sideways in a variety of actual classrooms in continuous use, and by then observing the distances with which these typical chairs seemed empirically to "shake down" in practice to give practical results.

This side distance was also checked against distances found in numbers of installations where tablet-arm chairs were bolted permanently to the floors according to the ideas of

(Concluded on page 90)

For Cold Weather and Warm Weather —

Ventilation of School Classrooms

*Henry Wright**

Classroom ventilation is a matter of consequence to school board members, school administrators, and others concerned with the planning and operation of school buildings. This is true for a number of reasons, not the least of which is that the whole subject of school ventilation has remained — despite all that has been said, and written and legislated about it — so stubbornly controversial. Because of this, and because of the way ventilation ties in with so many other aspects of school construction and administration, school officials frequently are called upon to act as referees between conflicting points of view, and to evaluate the merits of claims and counterclaims many of which hinge upon an understanding of the fundamental objectives of ventilation and its special application to the school field, especially to the school classroom.

The type of ventilation employed in a classroom may have an important influence on such seemingly disparate matters as the life of schoolroom furniture, the type of glass which should be used in the windows, the internal construction of the walls and roof, the space provided for storing outdoor clothing, and the fire safety of the building. It will, of course, have more obvious effects on the type of heating equipment used, the design of the windows, the cost of fuel, the cost of cleaning the building, and so on. Most important of all, it will have a very real effect on the health, efficiency, achievement level and attitudes of the pupils and teacher, and on evaluations of the school plant made by visitors.

The responsibility for the provision of proper ventilating equipment in the new school building rests primarily on the school architect and his heating and ventilating engineer. The type of system used will also be influenced by the regulations of those state authorities which set the minimum over-all standards to which new schools must conform. In the last analysis, however, it is the school board, acting with the advice of the architect and the school administrator, which must evaluate the importance of adequate ventilation with reference to other aspects of the school program, and determine the relative weight which this factor is to receive in the total program. Thus it is essential that school officials possess up-to-date information on the objectives of school ventilation, and have a rough working knowledge of the ways in which these objectives are usually achieved.

This knowledge is not easily acquired. The subject of ventilation, which seems relatively simple at first blush, is actually rather complex. What one man means by the term "ventilation," at one moment, may be quite different from what another man at another moment means by it, and frequently is quite different. Ventilation is defined by the American Society of Heating and Ventilating Engineers as "the process of supplying air to, or removing air from, any space by natural or mechanical means." This definition wisely has nothing to say about the *purposes* of ventilation, because these can be so varied, and even contradictory. For this reason even a group of specialists, in discussing ventilation, are in much the same position as were the fabled blind beggars in their discussion of the Rajah's elephant. One expert, feeling the elephant's ears, says that ventilation is a matter of cooling breezes to compensate for high air temperature (the most common use of the term in the residential field). Another, holding the elephant's tail, declares that ventilation is a question of diluting the air in an enclosed space in wintertime (or in an air-conditioned space in summer) with enough odor-free, smoke-free air to prevent the formation of perceptible objectionable odors, or fogging of the atmosphere by tobacco smoke. Still another, feeling of the elephant's trunk, has in mind the rapid interchange of indoor and outdoor air, feasible in the spring and fall (and in nonair-conditioned spaces in summer), which is capable of imparting to the air indoors the smell of growing things and, by no means incidentally, of keeping the concentration of disease-bearing organisms in the indoor atmosphere below the level which makes airborne infection probable. And finally the school expert, feeling the elephant's side, is likely to observe that ventilation is *primarily* a matter, in school classrooms as in other relatively crowded interior spaces, of admitting sufficient cool air to keep the indoor temperature from rising above the proper level due to heat gain from the occupants, the lighting equipment and/or the sun. And since in real life such a convocation is likely to consist of salesmen of various competitive products, the discussion may at times become vehement and even acrimonious.

Objectives of Ventilation

The point is, of course, that all of these experts (even the salesmen) may be correct. The objectives of ventilation vary with the climate, the uses of interior spaces, and the time of year. In the southern part of the country, school officials and architects are inclined to stress the importance of cooling air movement within the classroom; in northern areas this objective receives little attention because schools are rarely in session during really hot weather. In the Pacific-Northwest, a primary problem is one of providing enough air to dry out pupils' outdoor clothing, owing to the dampness of the climate. In northern Minnesota, North Dakota, Montana, and Maine, the admission of sufficient outdoor air for odor control, during periods of 10°- and 20°-below-zero weather, may result in lowering the relative humidity of the classroom air below a desirable level; in other areas if sufficient outdoor air is *not* admitted the relative humidity may rise to cause condensation on the window glass. In areas of high solar heat gain, admission of outdoor air for cooling purposes during the heating season has a greater than average significance, and may require greater ventilating capacity for classrooms with large unshielded glass areas (or better shielding of such glass areas).

Throughout the United States, each of the objectives of ventilation has some importance, but the relative importance of each varies with local climatic and even local social conditions. Nevertheless, certain generalities are valid for most climates. Thus it may be stated categorically that during the heating season, and near the beginning and near the end of the heating season, the primary functions of classroom ventilation are (*a*) to admit sufficient outdoor air, *at all times*, to prevent the formation of objectionable odors and to prevent the humidity from rising above a practicable level, and (*b*) to admit sufficient outdoor air, *when and as needed*, to prevent overheating of the room. Ventilation has other important functions, some of which have already been suggested, but (*a*) and (*b*) are normally the most important.

Winter-Weather Ventilation

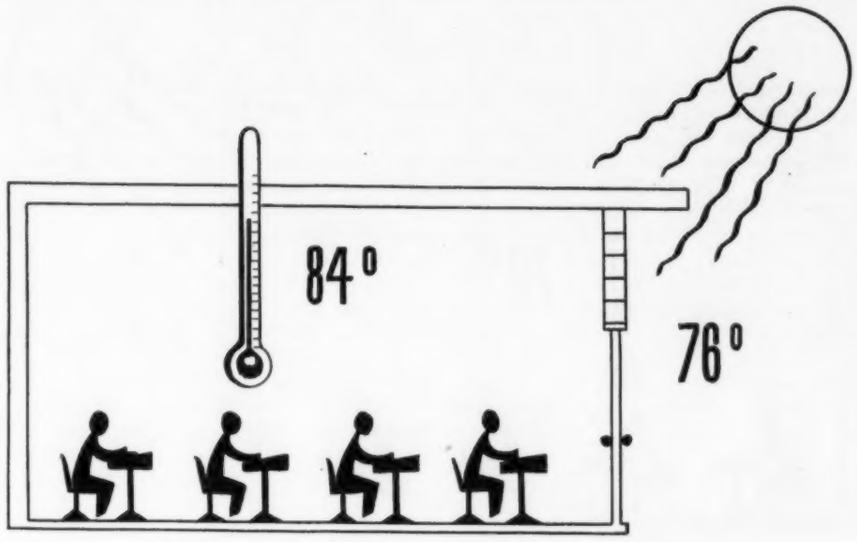
In order to understand the importance of proper ventilation during the heating season, it is instructive to consider what happens in classrooms which are unventilated, or poorly ventilated at this time of year. Take, first, the aspect of such a classroom in very cold weather. If, as is sometimes the case, no means of ventilation of the (*a*) type has been provided, two things are likely to happen. The first is the formation of an objectionable odor, particularly apparent to those (school officials and visiting parents) who enter the room after it has been occupied for some time — a sort of potpourri of smells composed partly of organic matter

*Consultant, Herman Nelson Division, American Air Filter Co., Inc.

from the skin and oral passages of the occupants, and partly of inorganic matter supplied by the chalkboards and interior finishes. The second is the condensation of water vapor (also from the occupants) in the form of frost or beads of moisture on the window glass.

These are the sure signs of inadequate cold-weather ventilation. However, they are not always present in rooms without a systematic outdoor air supply. The reason is that particular teachers, especially those in whom the olfactory sense dominates the sense of creature comfort, may, even in very cold weather, keep the windows open a sufficient portion of the time or to exactly the right extent to avoid the formation of unpleasant odors and unduly high humidities, or may adhere to the hallowed procedure of "airing the room" periodically. A really expert and experienced teacher, who combines such methods with careful throttling of the radiators, can do a fairly good job of cold-weather classroom ventilation, although it is difficult for even an old hand to prevent drafts due to the introduction of untempered outdoor air. There is some question, however, as to whether she can simultaneously do a good teaching job as well.

In milder winter weather, the effects of the absence of systematic, controlled ventilation of the (*b*) type are less obvious but no less important. Under such conditions a classroom dependent solely upon the windows for the admission of outdoor air, and on the teacher for control of the quantity of air to be admitted is likely — almost bound to be too hot part of the time and too cold part of the time; almost never will it be at exactly the temperature most conducive to the type of activity for which it is intended. A good teacher makes a poor thermostat. Moreover, even a science teacher is likely to be baffled by the thermal behavior of the average classroom in average winter weather. Under such conditions, the typical classroom tends to overheat even with the heating equipment *turned off entirely*, once it has been brought up to temperature through the operation of the heating equipment during the first hour or two of the school day. Thus,

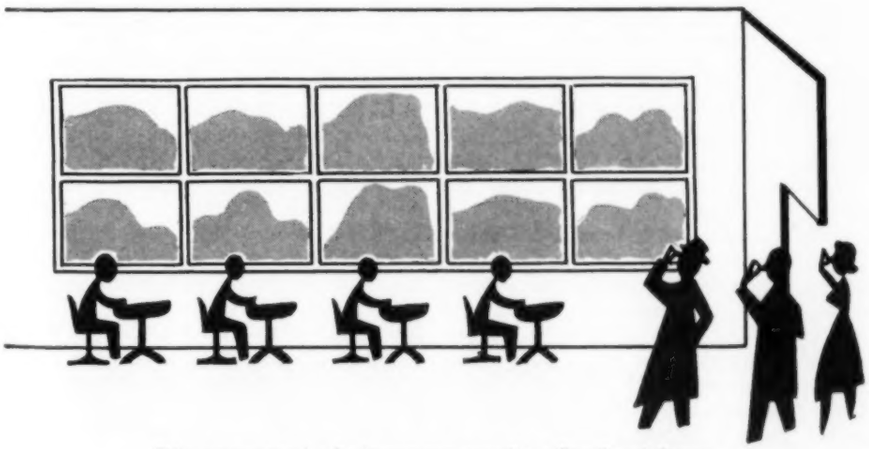


Unshielded windows pose ventilation problem.

even where a thermostat is provided to *keep the room from getting too cold*, it becomes the responsibility of the teacher, through the operation of the windows, to see that it does not get *too hot*, due to the heat given off by the pupils, by the lighting system when in operation, and from solar heat gain when the lights are not in use. In many cases where the windows are depended upon for winter ventilation, the heating equipment remains on, or partly on, throughout the school day, with the teacher engaged in a continual battle to compensate for this unnecessary heat gain as well as heat gain from other sources by regulation of the windows.

For these reasons, the results of a lack of systematic ventilation in mild winter weather are likely to be threefold: a waste of fuel due to unnecessary heating, a waste of the teacher's energy on a fruitless and time-consuming effort to maintain the thermal equilibrium of the room in the face of constantly shifting influences, and a waste of potential learning-ability resulting from loss of time due to colds and from pupil-lethargy induced by overheating.

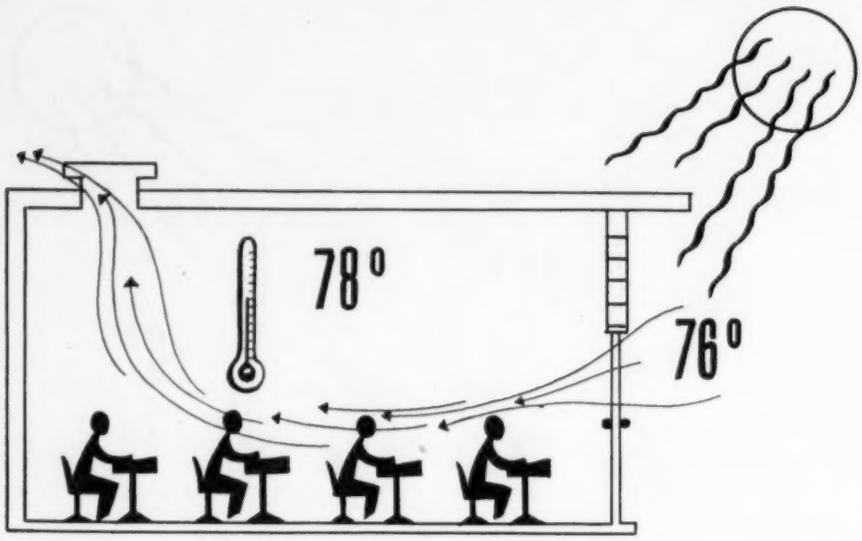
A system of controlled winter ventilation for the classroom is thus a fuel-saving, labor-saving, pupil-saving device for the maintenance of good atmospheric and thermal conditions at all times and under all conditions. The need for such a system is *independent of the type of heating equipment employed* (it is just as much needed, for example, with radiant heating equipment as with heating equipment of the conventional type). Its operation, however, must be *coordinated with the operation of the heating equipment*, since its most important function is the maintenance of proper temperature. It must be capable of introducing a controlled minimum of preheated outdoor air sufficient to prevent odor formation and excessive humidity in very cold weather, and of a considerably larger quantity of cool (but not too-cold) air in milder weather to prevent overheating of the room. Means must be provided for introducing this air without drafts. In very cold climates, it may also be desirable to add moisture to the air to keep its relative humidity from falling to a level which will have adverse effects such as excessive drying of the skin and lips, and adverse effects on wooden classroom furniture — although, as will be shown later, this objective might also be accomplished by providing a means of automatically reducing the minimum quantity of outdoor air drawn into the room in subzero weather. Any system of classroom ventilation, regardless of type, which provides all of these things, controlled on a room-by-room basis, constitutes a complete system of classroom ventilation for *winter* conditions; any system which does not provide all of them is incomplete to that extent.



The potpourri of classroom smells offends visitors.

Winter Ventilation Standards

Many states have set minimum standards of cold-weather ventilation, usually expressed in terms of so many cubic feet of outdoor air per pupil per minute, observance of which is a matter of law or conformance with fixed regulations. In other areas, a certain minimum is considered "good practice" and generally adhered to. Most such regulations reflect the time at which they originally were promulgated. Up to about 1920 it was the fashion to require a rather large minimum quantity of outdoor air per



Exhaust fan helps comfort in sunny rooms.

pupil, usually 30 cfm., on the erroneous assumption that the air in densely occupied rooms became chemically vitiated as the result of respiration. When this was shown not to be the case, and it was established that the "stuffiness" of crowded, unventilated rooms was due almost entirely to overheating, the pendulum swung the other way and some classrooms were equipped with ventilating equipment in which the outdoor air supply was arranged to shut off entirely whenever cooler air was not needed to reduce the room temperature. Meanwhile, the ventilation requirements established by law were gradually reduced from 30 cfm. to one half or one third of this quantity per pupil.

At present, the American Society of Heating and Ventilating Engineers, basing its opinion on experiments made at the Harvard School of Public Health, regards the following as "the minimum outdoor air requirement to remove objectionable body odors under laboratory conditions" —

Type of Occupants	*Air Space per Person, Cu. Ft.*	*Outdoor Air Supply CFM per Person*
Grade school children of average socioeconomic status	100	29
	200	**21**
	300	17
	500	11
Grade school children of lower socioeconomic status	200	38
Children attending private grade schools	100	22

Since the average classroom provides in the neighborhood of 200 cubic feet of air space per pupil, these figures represent a swinging back of the pendulum to a point about midway between the old 30 cfm. requirement and the 10 cfm., or "one third outdoor air" regulations which came into vogue as the result of promulgation of the "thermal theory of ventilation." Broadly speaking, with the exception of a few obsolete codes which still cling to the old 30 cfm. rule, most state requirements are now slightly *below* the level which these figures indicate as desirable.

It would be a mistake, however, to assume from this that any compelling reason exists to exceed such minimum requirements. Ventilation, in the sense of the term with which such regulations are concerned, is primarily a matter of aesthetics, since the only measurable bad effect of strong odors is a very slight influence on appetite. Moreover, since the occupants of a room quickly become accustomed to its odor, the principal effect of provision of less than the ideal quantity of outdoor air is on parents and other school visitors rather than on the pupils and teachers. Truly adequate minimum ventilation for odor control, in very cold weather, is thus justifiable only as a public relations gesture, if at all.

To put this on a practical footing, it may be pointed out that to provide 38 cfm. of outdoor air per pupil, which the A.S.H.V.E. table indicates might be desirable for classrooms serving grade school children of lower socioeconomic status, would probably double, and might possibly triple the heating cost of the average school. In 1924, it was estimated that to provide an extra 20 cfm. of outdoor air for the pupil population of New York State would require the expenditure of $200,000 a year for additional fuel; today, with the increase in pupil population, and the rises in fuel cost which have occurred in the meantime, this figure would be much higher. Socially, it might be more economical and desirable to spend this amount on improved housing and sanitary facilities, and on education in personal hygiene than on classroom ventilation.

Actually, the provision of any set minimum quantity of outdoor air for odor and humidity control is probably unnecessary in milder climates because the intermittent ventilation needed to prevent overheating is normally more than sufficient — and occurs with sufficient frequency — to supply this need. However, minimum ventilation is not economically important in such climates either, so very little is lost by going along with existing regulations. In colder climates, provision of 10 or 15 cfm. per pupil, or even a somewhat higher figure is probably justified in ordinary winter weather, but in very cold weather, codes permitting, this quantity might well be reduced for the sake of fuel economy and also to prevent excessive drying out of the classroom air (due to the very low absolute humidity of really cold air). In fact, since odors have no perceptible effect on health (or an effect which is just barely perceptible), whereas undue lowering of the relative humidity has manifest and immediate adverse consequences and also considerably increases the possibility of air-borne infection, regulation of the relative humidity rather than regulation of odors might logically be made the object of state codes. If it were not for the tremendous body of law and practice which would have to be set aside to do so, the minimum outdoor air supply might well be controlled with reference to the resulting indoor humidity, rather than being set at any fixed quantity or proportion of total air circulated, as at present.

Ventilation for Hygiene

No discussion of minimum standards of ventilation would be complete, in the light of present knowledge, without some reference to what is beginning to be called "sanitary ventilation" — by which is meant the effort to provide a relatively germ-free indoor atmosphere within confined spaces. Every enclosed space is a germ trap in the sense that germs expelled into the air (as by coughing and sneezing) have a life expectancy of several minutes, several hours, or even several days indoors. (Out of doors, the germ count per unit of atmosphere is held at low levels by the lethal effect of ultraviolet radiation from the sun.) Such germs, usually contained in droplets of moisture, tend to settle to the floor and other horizontal surfaces, and may be reintroduced into the atmosphere in combination with dust and lint, as a result of air currents across the floor and human activity within the room. It seems likely that the high incidence of respiratory diseases, and other diseases spread by air-borne infection during the winter is due in part to the resulting concentration of infective particles in the air of confined, crowded spaces.

In the spring and fall, when a rapid interchange of indoor and outdoor air can take place in the classroom, this concentration is never very high, and the statistical possibility of infection is greatly reduced. (It can never be eliminated completely, because of the possibility of infection by contact, and by "direct spray.") It is estimated that to produce this effect by ventilation, it is necessary that outdoor air be introduced into the room at the rate of sixty times its volume per hour, or, in the case of the average classroom, at the rate of 200 cfm. per pupil.

It would, of course, be entirely impracticable to maintain such a rate of ventilation in cold weather, at least with the type of classroom heating equipment now being used.

Besides an enormous increase in fuel consumption, such a ventilation rate would result in greatly lowering the indoor relative humidity unless elaborate humidifying equipment was employed. It should, however, be noted that here is a reason — an important reason — why classrooms should be freely and even lavishly ventilated whenever outdoor weather conditions permit, i.e., when heating is not required.

During the times of year when classrooms cannot be so ventilated, there are at least three things which can be done to reduce the health hazard which every crowded, confined space represents under such conditions:

1. *Scrupulous Cleanliness.* If dust is not permitted to remain on the floor or other horizontal surfaces, the possibility of germs reentering the air will be greatly reduced. The same applies to the control of dust within ventilating equipment.

2. *Humidity Control.* Germs live considerably longer at high and low relative humidities, and die most quickly at a relative humidity around 50 per cent (it is also probable that drying of the mucosa, associated with low absolute humidity, may increase the chances of infection). In very cold climates, where drying of the classroom air is likely to occur, it is not practical to maintain a relative humidity of 50 per cent even with double glazed windows and careful use of vapor barriers in the walls and roof, but consideration should be given such measures in new school construction so as to make possible the maintenance of higher humidities than now obtain in subzero weather. Provided the classroom has been constructed to withstand a high humidity in combination with low outdoor temperature, this can be achieved by reducing the rate of outdoor air intake, or by adding moisture to the air with humidifying equipment.

3. *Air Disinfection.* Under laboratory conditions, high "rates of kill" of air-borne bacteria have been achieved by two methods: saturation of the air with various disinfectants, notably triethylene glycol vapor, and by its irradiation with ultraviolet rays. In the school field, the second of these methods has been used extensively, and is now fairly common, despite a widespread tendency to question its effectiveness on the ground that school and community health statistics do not clearly indicate a reduced frequency of infectious diseases resulting from its use. This is a little like saying it is not worthwhile to supply children coming from homes that are likely to be insanitary with sanitary drinking cups: Since they are likely to become infected anyway, why bother? A more valid criteria would seem to be: Does air disinfection actually reduce the number of air-borne germs in the classroom, and does this, in turn, reduce the mathematical possibility of infection occurring within the room? Since the answer to both questions seems to be Yes, air disinfection seems to have the same *raison d'être* as most public health measures in the early stages of their use, and to warrant consideration on this basis.

Ventilation for Temperature Control

The rather extensive nature of the foregoing discussion of minimum rates of ventilation should not obscure the fact that the *primary* function of ventilation, in densely occupied spaces, is to prevent overheating. The victims of the Black Hole of Calcutta, the *Londonderry* disaster, and other classical instances of lack of ventilation did not die of asphyxiation, bad odors or germs; they died of heat stroke brought on by high temperatures, combined with high relative humidities, resulting from overcrowding. Similarly the lethargy and discomfort associated with crowded, poorly ventilated rooms is due almost entirely to overheating, and the familiar feeling of euphoria which comes on emerging from such rooms to the out-of-doors is induced, not by the "freshness" of the air, but by the sudden release of heat accumulated in the body tissues and a drop in skin temperature. To underscore this point, it may be said with complete accuracy that most so-called stuffiness could just as well be avoided by training an electric fan on a block of ice as by admitting outdoor air — in fact, this is what actually *was* done to avoid it, in some places of public assemblage in summertime before the advent of air conditioning. It is the *coolness* of the outdoor air we normally seek when ventilating a classroom in winter, and not its so-called freshness in the sense of chemical purity or freedom from bacteria.

Every school child is a small stove, giving off as much heat as a 75-watt light bulb. The teacher is a somewhat larger stove, with about 100 watts capacity. These figures are not large, it is true, but multiply the first by 30 and add the second and you have 2350 watts, or about 8000 B.T.U. — which is the equivalent of about 33 sq. ft. of steam radiation. Add six 300-watt light bulbs — real ones, this time — and you have enough heat to take care of the average classroom down to about 40 degrees outdoor temperature, and *overheat* the room at any temperature above this figure, allowing adequate ventilation for odor control. Turn off the lights and turn on the sun, and you may have more than enough heat even for zero weather, during the middle part of the day.

Most adults are familiar with this process in terms of what happens during the heating season in crowded, unventilated meeting rooms, and crowded home living rooms on party nights. In such cases, even without solar heat gain, the room quickly gets "stuffy" — i.e., too hot. Open the window, and those closest to it, and in the path of the cold air which spills over the sill and runs across the floor complain, and insist on closing it. You must settle for drafts, without overheating, or overheating without drafts (the latter usually wins). You can't be without both. You can't, that is, unless . . . unless some means are available for permitting outdoor air to enter the room and *mix thoroughly with the indoor air* without impinging on the occupants of the room before this mixture has taken place. This is the essence of cold-weather ventilation for crowded rooms — the *only* way that overheating can be avoided without creating drafts. Except in mild climates, windows cannot be regarded as such a means — as everyday experience, of the type described above, effectively demonstrates. Nor, on the other hand, can a system of ventilation in which outdoor air is preheated to room temperature before coming in contact with room air. The function of air from the outside is to *cool* the air in the room; this it cannot do if it is not permitted to contact the room air in its *cool state.*

Such cooling can be accomplished in three ways:

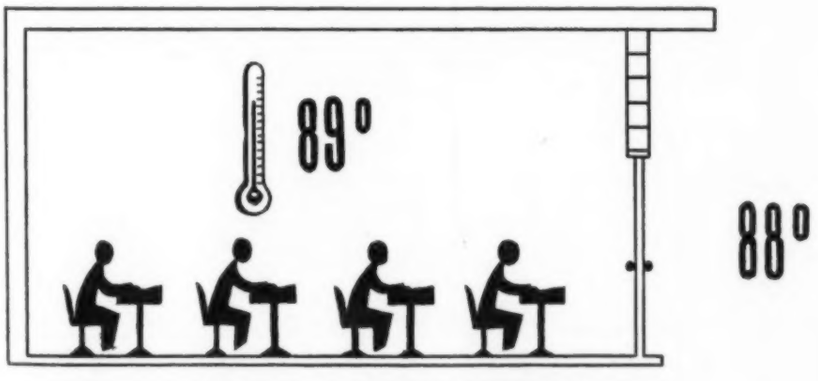
1. By drawing off the room air to some remote point, where it can be mixed with outdoor air and returned to the room through a second set of ducts.

2. By supplying cool outdoor air from a remote point, through a set of ducts, and arranging a mixing chamber adjacent to the room in which this air can somehow be mixed (as by aspiration) with room air. Depending on the nature of the discharge, this mixing action can continue in the upper, unoccupied portion of the room.

3. By drawing outdoor air directly into the room through a unit ventilator, mixing it with room air within the ventilator cabinet, and discharging the mixed air at high velocity toward the ceiling, where further mixing with room air can occur.

The writer must confess to a strong prejudice in favor of the third method for practically all conditions. However, an effort

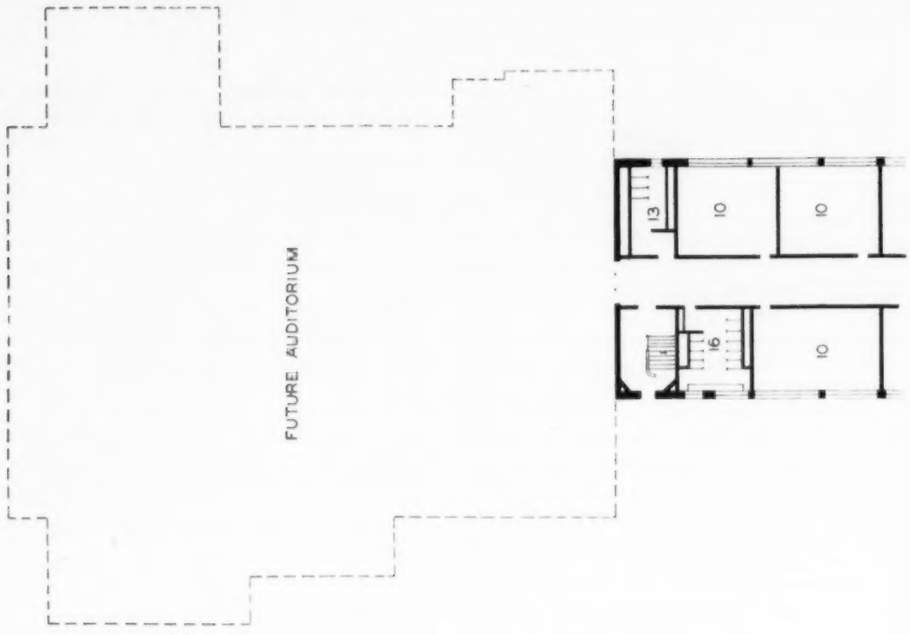
(Continued on page 76)



Air movement is needed in warm days.

Indianapolis Erects New Emmerich Manual Training High School

Robert B. Johnson *



The Indianapolis School City, under the leadership of H. L. Shibler, general superintendent of education, is building a $3,000,000 high school as part of its five-year building program.

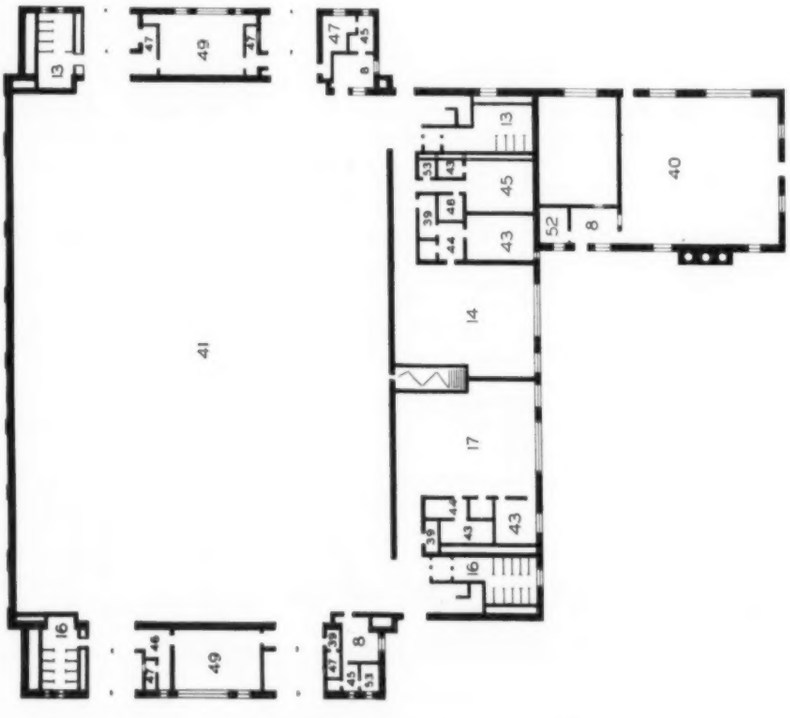
In order to remove one of its large high schools from the center of an industrial area, and in order to correlate the site of the new high school with the increased growth in the south central part of the city, 21 acres of land were purchased for the new plant. The buildings under construction will be so situated within the plot that space for the addition of an auditorium unit, additional classroom buildings, parking facilities, and athletic and physical education areas will be the most advantageous possible.

Preliminary planning for the new Emmerich Manual Training High School, which is a four-year comprehensive high school offering a state accepted program, was begun in 1944. The land was purchased in 1945; however, because of World War II and restrictions on construction, the contracts for drafting the plans were not let until 1949. Working drawings and specifications were approved in June, 1950.

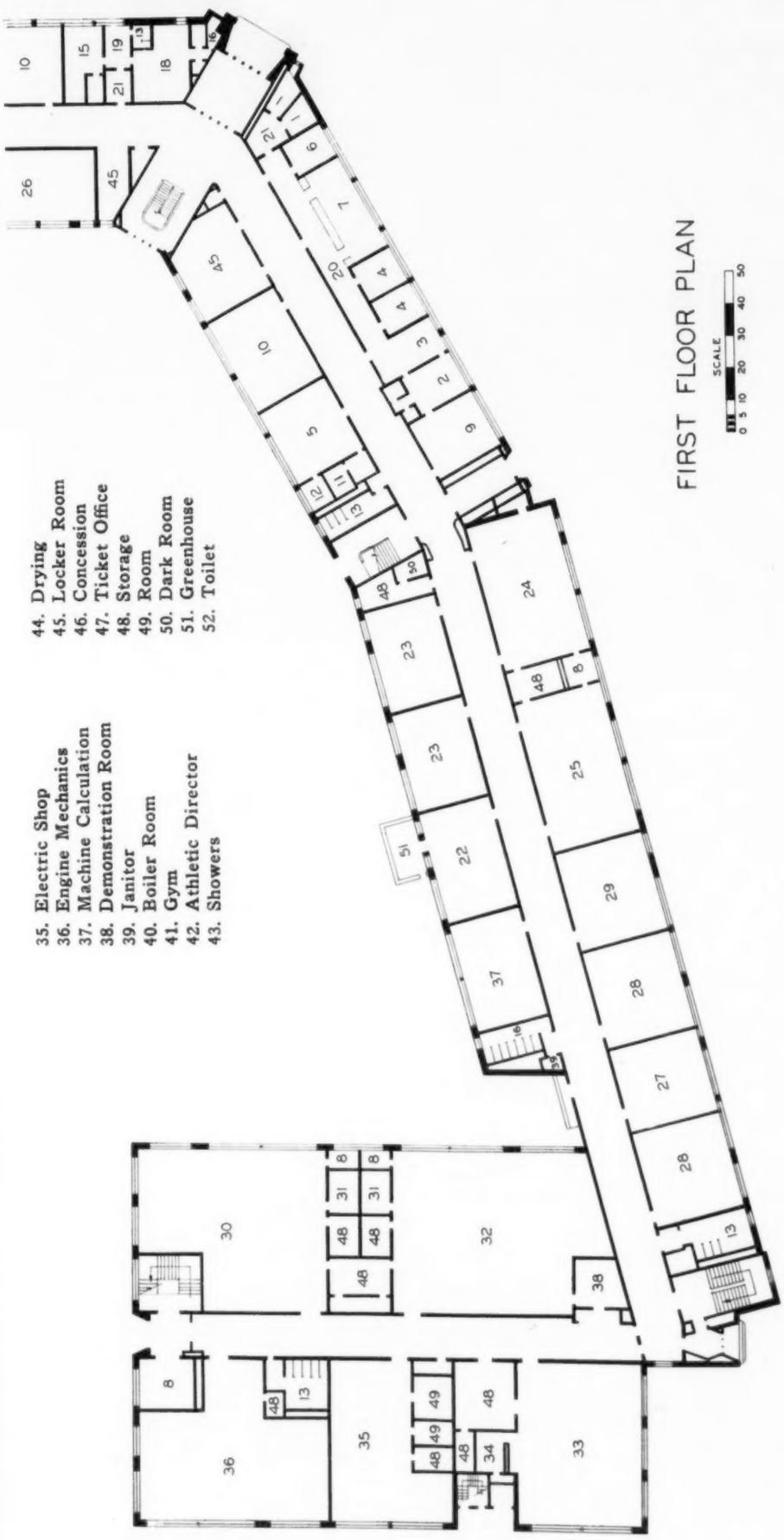
Because of rising construction costs, the auditorium unit of these original plans was eliminated temporarily, and the plans as revised were finally accepted in April, 1951. Construction was started August 1, 1951. Following the educational planning by the school authorities, the architectural planning was done by D. A. Bohlen & Son, of Indianapolis; the site for the building was selected by the board of school commissioners; M. V. Bailey, business manager for the schools, handled the business problems connected with the structure.

The present construction for the high school consists of two separate buildings — a scholastic building and a gymnasium building with a powerhouse unit attached. The work is being financed by a bond issue of three million dollars. A tax levy of 20 cents

1. Dean
2. Principal
3. Principal's Secretary
4. Vice Principal
5. Teachers
6. Bookkeeper
7. General Office
8. Office
9. Conference Room
10. Classroom
11. Women's Toilet
12. Men's Toilet
13. Boy's Toilet
14. Boy's Locker Room
15. Boy's Room
16. Girl's Toilet
17. Girl's Locker Room
18. Girl's Room
19. Nurse
20. Reception Room
21. Waiting Room
22. General Lab.
23. Biology
24. Chemical Lab.
25. Physics Lab.
26. Journalism
27. Printing
28. Drafting
29. Salesmanship
30. Metal Shop
31. Tool Room
32. Machine Shop
33. Wood Shop
34. Gluing and Varnishing



*Assistant in Public Relations, Indianapolis Public Schools, Indianapolis, Ind.



Dr. H. L. Shibler
Superintendent of Schools
Indianapolis, Indiana

for a cumulative building fund is being used for the erection of other school buildings and additions in the school city.

The buildings are of moderate modern design; external construction includes a reddish-tone face brick with a considerable amount of Bedford stone trim. The main entrance to the scholastic building will be built entirely of Bedford stone. All windows will be of aluminum sash surmounted by a range of glass blocks. The scholastic building, containing 1,918,000 cubic feet, is made up of three units designated for convenience as *A*, *B*, and *C*.

The *A* unit includes five shops on the first floor. These will be planned and equipped for woodwork, electrical work, engine mechanics, machine-shop practice, and metalwork. This unit will also contain storage and stock rooms, offices, a demonstration room, and a loading dock and freight elevator for the cafeteria.

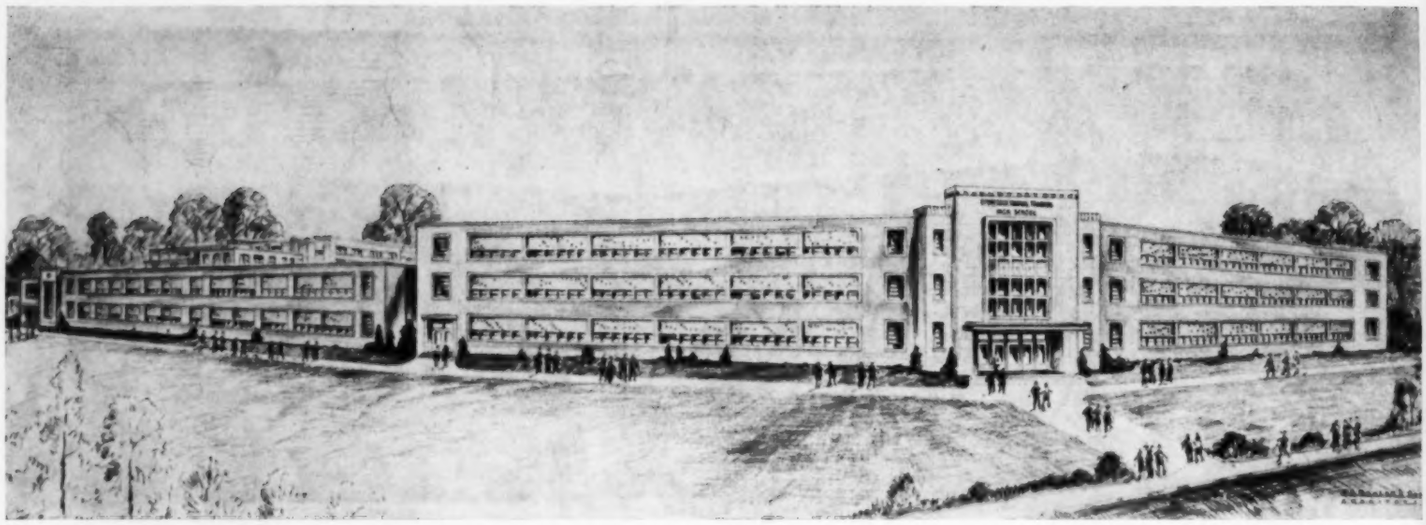
The cafeteria, located on the basement floor, will seat approximately 600 students at one time. The two serving counters have been so arranged that one or two lines may be served at the same time. The walls of the cafeteria will be of glazed tile; the ceiling will be of acoustical material; and the floors will be of greaseproof tile. Quarry tile floors will be used in the kitchen and service rooms and around the cafeteria counter.

In addition to the cafeteria, the faculty dining room, main kitchen, and storage rooms will also be located on the basement floor of the *A* unit.

The *B* unit of the scholastic building also will have a basement. This will be used only for ventilating and electrical equipment, maintenance service, and storage.

On the first floor of the *B* unit will be located two drafting rooms, a shop for teaching printing, a classroom for salesmanship, the physics and chemistry laboratories, a room for teaching machine calculation, the biology laboratories, a general laboratory, and a greenhouse. There will also be offices and storage rooms for each of the groups of laboratories and departments.

The second floor of the *B* unit will contain the home-economics department, consist-



Architect's Perspective, Emmerich Manual Training High School, Indianapolis, Indiana. — D. A. Bohlen & Son, Architects, Indianapolis, Indiana.

ing of food and garment construction laboratories, the home management center, and storage rooms. There will also be three classrooms on this floor.

The *C* unit, which is entered through the main entrances, will have a large foyer and a monumental stairway leading to the second and third floors. The administrative offices, a teachers' rest and study center, rooms for the health unit, and six classrooms including the journalism room, will also be on the first floor.

On the second floor of the *C* unit there will be 14 classrooms, a radio studio, and the library rooms. Included in this number of classrooms are four rooms for art instruction.

The third floor of unit *C* will also contain 14 classrooms. In the tower section (above the main entrance) will be a large alumni room and a trophy room.

The classrooms throughout the scholastic units have been planned to minimize the distance each student will have to travel in making class changes. Visual-education rooms have been planned to be located convenient to all academic and laboratory departments.

The Gymnasium Building

The gymnasium building will be separated from the scholastic building. The main floor area is 104 by 149 feet, and around the playing floor will be pull-out bleachers to accommodate approximately 2500 persons.

The gymnasium has been so designed that the floor space may be divided into two areas each 104 by 74 feet. These small areas will be used for girls' and boys' physical education classes and small audiences. The entire building has been planned so that the playing floor will be equally useful as a physical education space, for basketball games, auditorium programs, and school assemblies.

On the main floor of the gymnasium, classrooms and the school team's locker and shower rooms will be provided. Lockers, showers, drying rooms, offices, and supply rooms for the physical education department are also to be located on this floor.

At the mezzanine level are the boys' and girls' general utility rooms which may be used for corrective gymnastics or small group activities. Rooms for the visiting team and for storing equipment are also at the mezzanine level. Six entrances are planned for the gymnasium to insure easy access and departure from the playing floor. The building will contain 789,250 cubic feet.

The powerhouse, containing 72,080 cubic feet, will adjoin the gymnasium unit. It will house the oil burning boilers with which the group of buildings will be heated.

Construction Details

The buildings have been designed to be as nearly noncombustible as possible. The *B* and *C* units of the scholastic building are structural reinforced concrete of skeleton design. The *A* unit will be constructed of reinforced concrete and structural steel. The gymnasium and powerhouse buildings will have structural steel frames.

In the corridors of all buildings, glazed brick wainscoting approximately 5 feet high will be used. Above the wainscoting, acoustical type blocks will be used. These block walls will not be plastered in order to use the acoustical absorption of the block to assist in sound control.

The floors of the corridors and where much traffic is expected will be of terrazzo. Floors of asphalt and rubber tile will be used in the classrooms.

All ceilings are to be of acoustical materials. Roofs will be flat and covered with asphalt and gravel.

The buildings will be heated with low-pressure steam provided by means of oil-fired steel boilers. The rooms will be mechanically ventilated by tempered air forced into the rooms.

The exterior of the scholastic building has been designed in modules of 4 feet in order that the partitions dividing the rooms in the *B* and *C* units may be taken down and moved whenever necessary to increase or decrease the size of rooms. These partitions are of soundproof metal construction to facilitate disassembly and assembly. The wiring for lighting and the heating and ventilating devices in these areas of the school have been arranged to facilitate the changing of room sizes.

The lighting of the buildings will be of fluorescent type. It is planned to keep carefully designed foot-candle intensity throughout the rooms and corridors.

The unit cost of the *A*, *B*, and *C* units of the scholastic building will average $1.01 per cubic foot. The gymnasium and powerhouse buildings will cost 79 cents per cubic foot.

Parking facilities surrounding the school will accommodate the faculty and student cars during school hours, and will be ample for the patrons who will attend basketball games, school plays, and other community events held in the gymnasium or other rooms.

The school site is adjacent to a large city park.

SCHOOL BUILDING

► One of the outstanding projects in Carroll County, Ark., has been the erection of new school buildings in Berryville. A number of buildings were destroyed in the 1942 tornado, and it was necessary to use old CCC camp buildings. Following the war, a campaign was started to raise funds for new buildings, in which the school board and the Junior Chamber of Commerce cooperated. A total of $56,000 was raised by donations obtained from 1750 citizens. The money raised by this plan was used to construct new buildings which efficiently accommodate more than 800 pupils.

► Mount Pleasant, Ill. The school board has purchased a seven-acre site for a new 8-room school, to accommodate grades kindergarten to five. A 4-room addition will be erected at the former school erected in 1949.

► Melrose Park, Ill. The school board has begun the construction of an addition to the Mannheim elementary school, to cost $240,000. An addition to the Roy School will be constructed, at a cost of $450,000, and plans are in progress for an addition to the Scott School.

► The school board at Eureka Springs, Ark., has completed a very efficient, economical, and convenient school building. The building which accommodates 650 pupils, was erected at a cost of $5.65 per square foot. T. Ewing Shelton prepared the plans and supervised the construction.

► At Sault Ste. Marie, Mich., the new Lincoln elementary school was dedicated as a "living symbol of democracy" with a fitting program. In addition to classrooms, the building contains kindergartens, a gymnasium-auditorium, an arts and crafts room. The 20 classrooms accommodate 600 pupils.

Street View, Roosevelt Grade School, Watertown, South Dakota. — Hugill, Blatherwick & Fritzel, Architects, Sioux Falls, South Dakota.

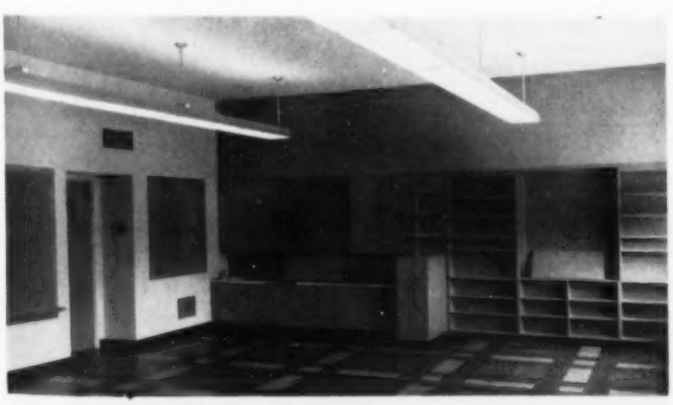
WHEN BUILDING "Too Many Cooks Don't Spoil the Broth"

*G. C. Hugill**

The more cooks — the better the broth, is the experience of the board of education and the school administration of Watertown, S. Dak., where we have just completed the construction of a new elementary school unit. At the very outset we solicited ideas from many sources and encouraged all who were interested to sit in on the planning sessions. Questionnaires and check lists were sent out to patrons, teachers, custodians, and supervisors. This procedure gave these interested groups ample opportunity to indicate what they would like to see included in a new elementary building with which they might be connected. We were amazed and pleased at the response received from our initial offer, and likewise at the continued interest during the time when the building was being designed and constructed. It can be said honestly that this new unit is "a building of a hundred architects."

Ours was a situation typical in many mid-

*Partner, Hugill, Blatherwick, & Fritzel, Architects, Sioux Falls, S. Dak.

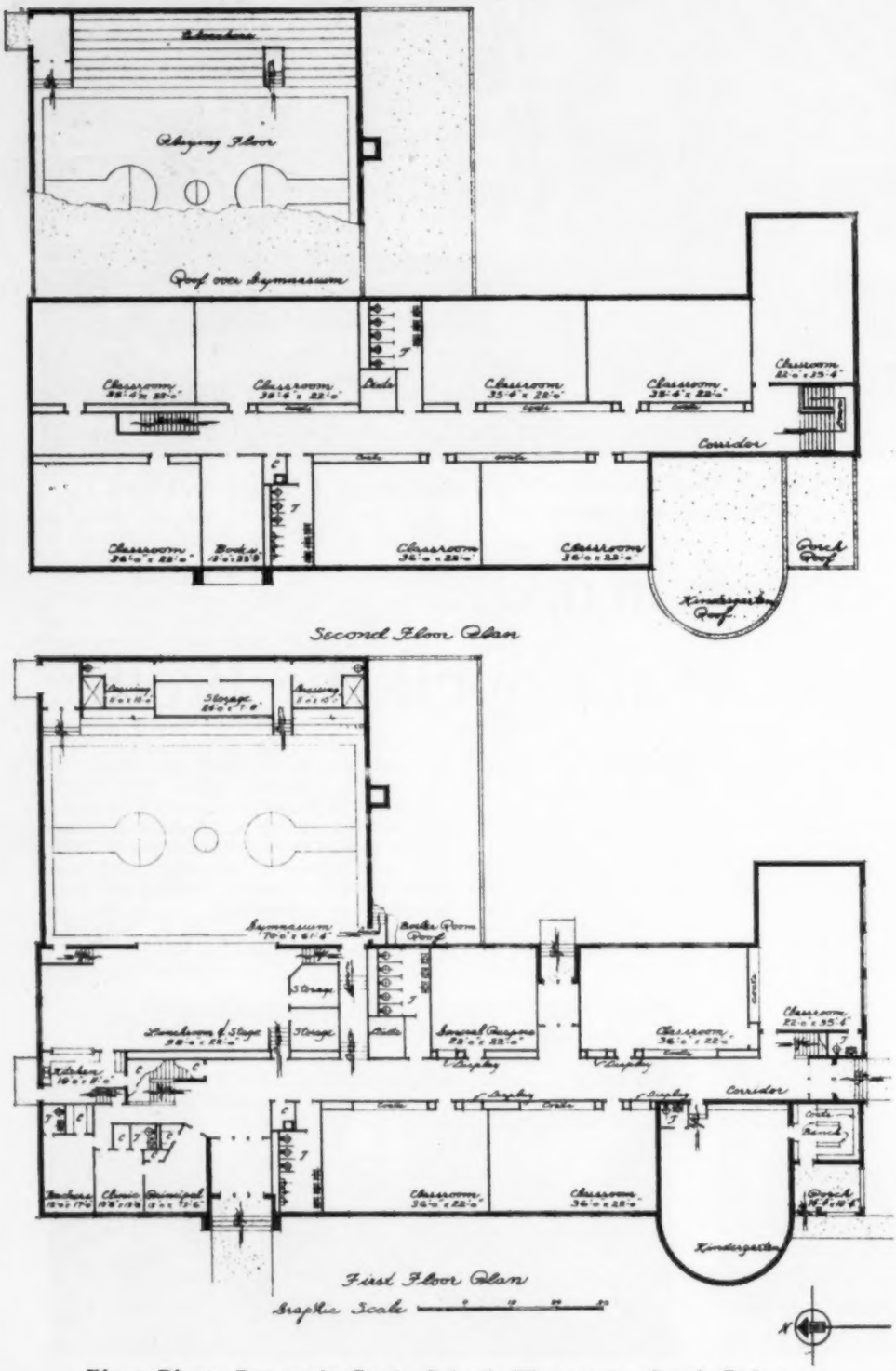


Typical classroom showing built in sink and storage cabinets, display case, and bookcases.

Gymnasium as seen from the stage.

western cities of ten thousand or more population. By 1947 it had become evident to our board of education that the increased birth rate during the war years was creating a definite schoolhousing problem, which would be serious by 1949 and each year thereafter. In looking ahead it was also evident that this rapid increase in enrollment would create housing problems later on in our junior and senior high schools. Fortunately one of our six grade school buildings was located in the same block adjoining our junior and senior high school buildings, so that by vacating this building and constructing connecting corridors, the crowded conditions on the secondary level could be cared for during a few years. Therefore, our first problem was to find a suitable location for a new elementary building.

This problem was solved when the City Park Board deeded us a square block of park in a suitably situated area. Since it was well landscaped with trees and shrubs the land made a beautiful setting for a new building.



Floor Plans, Roosevelt Grade School, Watertown, South Dakota.— Hugill, Blatherwick & Fritzel, Architects, Sioux Falls, South Dakota.

An Education for Superintendent

The business of planning and supervising the construction of a new building was a liberal education for the superintendent and board members for whom it was an entirely new experience. They soon found that details involved consumed far more time than they had anticipated. At the outset frequent conferences were held where all interested persons could attend and give expression to their likes and dislikes concerning features of a new building. It is surprising the number of excellent ideas that can be picked up and incorporated in this fashion; also the number of mistakes that can be avoided by getting the ideas of teachers, patrons, and custodians who have had previous experience in buildings which had outstandingly fine or objectionable features. In checking back over the ideas originally presented it was found that we were able to incorporate over 90 per cent of the ideas into the now completed building.

Good fortune seemed to follow us from the very start. The bonds were approved by the citizens by a ten-to-one margin. This was followed by a sale of the bonds which went for one of the lowest rates on record for schools and municipalities in this area. They were ten-year bonds at an interest cost of 1.36 per cent. Again we were fortunate when the bids were opened for the general, electrical, and mechanical contracts. They totaled $326,000 which was ten to fifteen thousand dollars less than the architects had anticipated. On a cubic footage basis the cost amounted to 80 cents; on a square foot basis it was $10.90. This seemed to be a low point in recent construction costs as similar contracts that were being let currently ranged in cost from ninety cents to more than a dollar per cubic foot. Considering the type of construction, the number of special and auxiliary rooms, the amount of cabinetwork and other features throughout the building, we feel that we have secured a remarkably fine bargain.

The new unit has a capacity of 450 children from kindergarten through the sixth grade. Some of the features which we feel make it an excellent building are described below. A maximum of natural light is provided by means of continuous 30-inch panels of clear glass surmounted by five feet of directional glass block. This light is supplemented by the use of a double row of continuous fluorescent fixtures running the full length of each classroom. Each room is equipped with green glass chalkboards with a minimum of 100 square feet of tackboard on three walls. Corkboard is provided on the backs of wardrobe doors, on the back of the access doors to the corridor display cabinet, above and below the chalkboards, above the work space, and in the center of the shelving in the book-nook corner at the back of the room. Blond, movable unit-type furniture has been supplied throughout the building.

Special Materials Used

Acoustical plaster was used in all of the rooms, except the gymnasium-auditorium, which has acoustical tile. The acoustical plaster was sprayed with a light yellow paint which makes it an ideal reflecting surface for both natural and artificial lighting.

Colored asphalt tile was used in all of

View of typical classroom showing book-nook, "what-not" projection, storage cabinets, and sink.

the rooms, the corridors, and in the gymnasium. In each room two or three colors were combined to give a variety of patterns. In the gymnasium permanent outlines of basketball and volleyball courts were laid out on the floors using 2-inch strips of asphalt tile in contrasting colors. The only maple floor to be found in the building is on the stage.

The gymnasium has permanent bleachers which seat 350 persons. When converted into an auditorium the seating capacity is increased to 800 by means of folding chairs which are stored on roll-away dollies under the floor of the stage.

The kindergarten room is one of the show places of the school because of its unusual construction and interior features. The room measures 32 by 40 feet and has its own entrance, a large sheltered porch which opens directly into a 10 by 15-foot wardrobe and storage room. Here along one wall were placed storage cabinets with deep inclined shelves for children's rugs. The outer wall of the main room is in the shape of a complete semicircle having a radius of 16 feet. This semicircle is made up of glass block and vision-strip clear glass windows at eye level of kindergarten children. The room has its own toilet facilities and a 20-foot work space area, with a sink. Underneath this work space area are fixed storage cabinets and three roll-away type cabinets for storage of toys and other materials which may be easily moved to any part of the room before the contents are removed.

Another feature of the kindergarten room is a large circular floor insert of asphalt tile located near the center of the room. This insert is 14 feet in diameter and is distinguished by its profusion of color. There are 15 pictorial subjects in 16 different colors. Primarily these subjects are portrayals of characters made famous in Mother Goose rhymes. The insert was designed by our art supervisor and constructed by the flooring manufacturers.

Color Used

Considerable color was used in each classroom. Two or three colors were employed on the walls of each room to harmonize with the colors used in the tile floors.

Most of the cabinetwork is to be found at the rear of each classroom. The rear wall was divided equally into two types of activity areas and separated by a narrow storage cabinet above which were placed three "what-not" shelves. This division cabinet projects 3 feet into the room. On the window side of this projection a book-nook has been created consisting of 65 lineal feet of adjustable shelving surrounding a tackboard area 4 feet square. Located in front of this book-nook are a large library table and chairs. On the other side of the projection is a 10-foot work space with a sink at one end. The sink has one faucet of single-temperatured water. Above and below the work space are to be found wall and storage cabinets which will prove to be more than adequate.

Ceramic tile floors are to be found at all entrances and in the toilet rooms. The drinking fountains are recessed. The back of each fountain is of mosaic tile with a 13-inch square hand-decorated insert of animals or people in the center. The 9-foot wide corridors have asphalt tile floors and light tan-colored glazed tile wainscoting to a height of 5 feet. The remainder of the wall is plaster.

Each classroom has its own display case which faces the corridor. The case is 4 feet square and contains three adjustable glass shelves. Corkboard covers the inside of the access doors on the room side of the case. Each case has its own fluorescent light.

Rooms are heated by direct and indirect radiation. Finned pipe radiators with covers are located under all windows and are thermostatically controlled in each room. A central forced-air ventilation system furnishes adequate fresh heated air to all parts of the building. The system is also equipped with an electrostatic type air filter.

In addition to the 14 classrooms, clinic,

View on stage-lunchroom looking toward serving window off kitchen.

office, teachers' lounge, library, and auditorium-gymnasium, we have a combined stage-and-cafeteria which is a unique feature that has been declared a tremendous success. We felt that a stage in an elementary building had very limited use so we conceived the idea of providing for a larger than usual stage (22 by 65 ft.) and added an adjacent modern kitchen unit at one end. The kitchen has a separate outside entrance as do most of the first floor classrooms. On the stage we use six 14-foot collapsible roll-away type tables with attached benches. These new-type dining tables are of all-steel construction with hard plastic tops. They take up very little room when folded and rolled to one side. Approximately 120 children can be seated at one time for noon lunch in this combined stage-dining room. This room is separated from the gymnasium by use of a plastic folding door in two colors.

Further Data

Additional descriptive data follows:

Exterior Walls: These are surfaced with rough-texture buff fireclay brick trimmed with a liberal amount of precast stone.

Interior Walls: The foundation walls are entirely reinforced concrete. The interior gymnasium walls consist of 7 feet of glazed tile surmounted by cinder block. Nonsupporting partition walls are of a fireproof gypsum material.

Floors: All rooms on the first floor are of concrete poured directly on a gravel base. A 3-foot pipe trench follows the outside walls completely around the building. On the second floor, the floors consist of reinforced concrete laid on steel bar joists.

Roof: The roof is supported by steel bar joists. The deck consists of two 1-inch layers of insulating board secured to a steel deck over which has been laid pitch-and-gravel ten-year bonded roofing material.

Door and Windows: All interior and exterior door frames are of steel. Window frames are aluminum, with three adjustable window sections in each room. All window sills throughout are of polished marble.

Interior Wall Finish: The upper portion of all classroom walls are finished with sand-finish plaster having two coats of flat paint of eye-ease color applied in various combinations. Several of the rooms have ends painted a dusty red and side walls of aqua green, or green ends with sunrise yellow sidewalls. Walls of toilet rooms are glazed ceramic tile in a variety of colors.

Ceilings: All ceilings are of metal lath to which has been applied acoustical plaster or plaster and sound-absorbent tiles.

Woodwork: All woodwork is birch to which has been applied a light tint of driftwood stain and varnish. A large, lighted glassed-in bulletin board was located outside the principal's office in the vestibule at the main entrance. By opening one of the access doors on the office side a full view of the vestibule is possible.

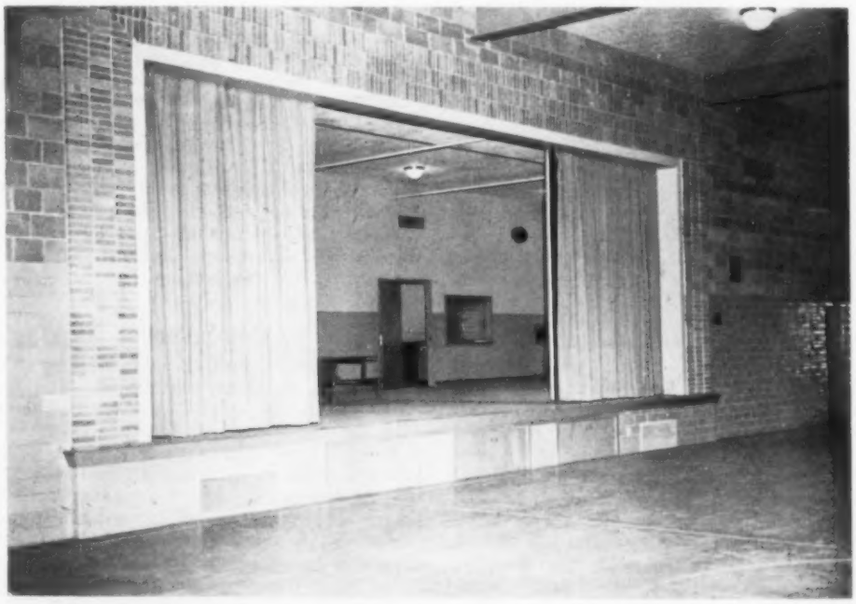
Plumbing and Heating: Single-temperatured water, automatically controlled, is piped to all rooms and to washbowls in the toilets. The only rooms to receive both hot and cold water are the dressing rooms in the gymnasium, the kitchen, and the clinic. The direct-radiation system is a hot water type with pumps that maintain constant circulation throughout the building. The amount of water to circulate through the radiators is determined by the thermostatic controls in each room. The gymnasium-auditorium has a separate blower unit for indirect radiation.

Electrical Work: Fluorescent lighting has been used in all classrooms; incandescent light in halls, storage closets, toilets, and gymnasium. Two switches control corridor lights, each switch operating alternate lights the full length of the corridors. In this manner it is possible to have amply lighted corridors during most of the year with only one set of lights. Stage and auditorium fixtures consist of 500-watt recessed units.

Conduit pipe leads from the office to all rooms in the building. In the future this can be used for an intercommunication speaker system or for television. At the present time it serves as a buzzer system for calling teachers and custodian staff.

Dual light controls are also located in the library on the second floor.

The architects were Messrs. Hugill, Blatherwick & Fritzel of Sioux Falls, S. Dak. The engineers were G. M. Orr Engineering Company, Minneapolis, Minn.



View of gymnasium floor showing stage opening and area used as stage-lunchroom. Door leading to kitchen and serving window in center background.

Oakland Completes New Trade-Technical Institute

Paul D. Thomas* and H. Neil Wright**

Paul D. Thomas

Harold Neil Wright

The Oakland Public Schools have just completed construction of a million dollar addition to the Laney Trade and Technical Institute. The new structure consisting of two units will house 12 of the 37 different full-time trades courses now offered, together with three new classes expanding the program.

The main two-story building includes foods-trades classes in restaurant cooking, baking, and waitress and soda fountain work; the printing trades which include hand composition, linotype, presswork, offset printing, and other typographical techniques. Cosmetology, pressing, spotting, shoe rebuilding, upholstery, refrigeration, machine shop, industrial radio repair, radio communications, and a new class in commercial photography complete the trade classes housed in this structure. The second one-story building has been constructed for the automotive trades including training for mechanics, body and fender repairmen, and auto painters.

These new buildings represent the result of a unique planning program in which shop instructors, trade advisory committees, and the school administrative, architectural and engineering staffs all participated.

As the first step in planning, the day and evening school principals and the three trade and apprentice co-ordinators met with the instructors to determine the basic area requirements. Each staff member then worked with a small group of instructors developing specific housing and equipment requirements for each class. The basic shop principles established by the state-wide Committee on School Shop Planning[1] under the chairmanship of Dr. Spencer Benbow, were used as the guide in making these preliminary plans.

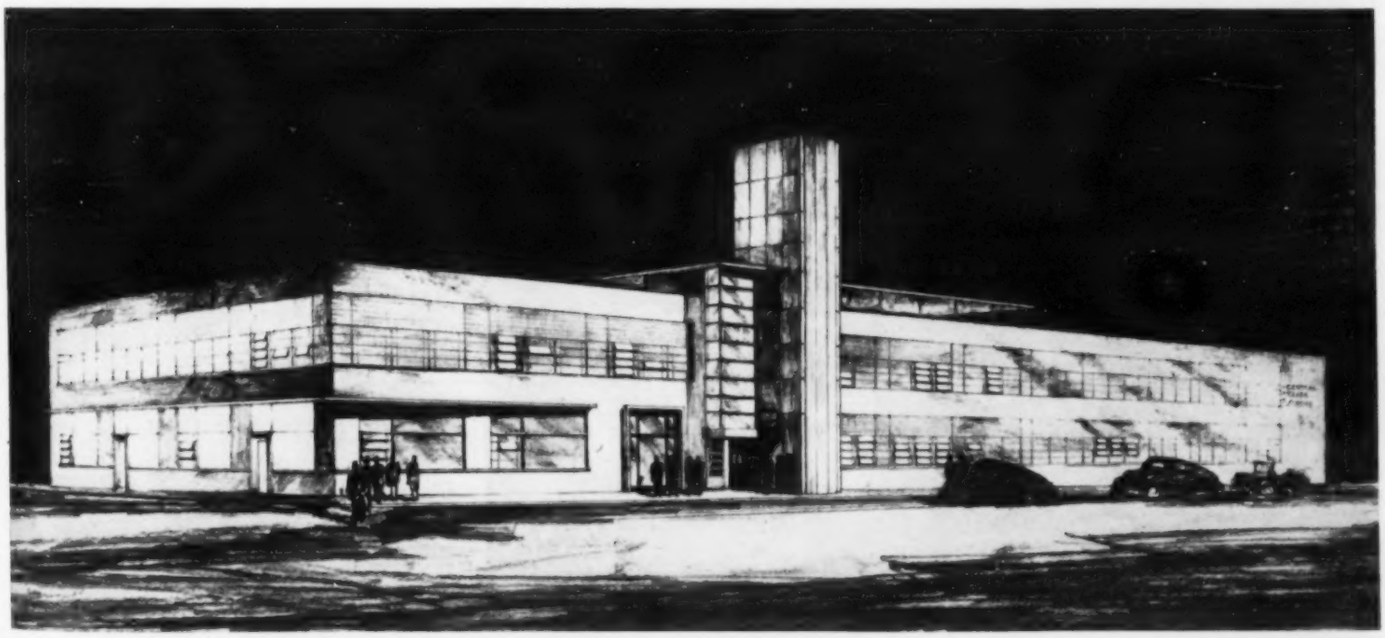
Next, the architectural and engineering staff, under the supervision of Charles Whitton, prepared layouts from the instructors' recommendations. These layouts were then submitted to the trade advisory committees for review and recommendations. Layouts acceptable to the instructors, the committees, and the staff were then incorporated in the final building plans of the architect, Geoffrey K. Bangs. (See Plans 1 and 2.) All offices, conference rooms, and related classrooms are in a near-by semipermanent building at 240 East Tenth Street, Oakland. The two city blocks of the campus are located within walking distance of the downtown area and near all main interurban transportation lines.

The new structures comprising 72,000 square feet, are of reinforced concrete construction throughout. The stairways are of cast terrazzo with safety treads, and the walls in the main hallway and entrance foyer are faced with satin-finish, pre-cast terrazzo.

*Principal, Joseph C. Laney Trade and Technical Institute, Oakland, Calif.

**Evening Principal, Joseph C. Laney Trade and Technical Institute, Oakland, Calif.

[1]"Guide for Housing and Layout of School Shops in California" — California State Department of Education, October, 1950.



Architect's Perspective, Laney Trade and Technical Institute, Oakland, California. — Geoffrey K. Bangs, Architect, San Francisco, California.

A popular shop is used by the pre-apprentice upholstery class.

Acoustical ceilings are used in all classrooms, the halls, and in many of the shops. The dressing rooms and lavatory areas are finished in glazed tile in attractive modern colors.

Power and complete heating units are in the basement area of the main building. The hot-water space heating system includes two fully automatic combination gas and oil fired boilers with provisions for additional boilers for three additional buildings to be constructed at a future date. Both buildings have automatic pneumatic-type temperature controls.

Other central features of the training plant include: a domestic hot water heating system, a high pressure steam system for the clothes pressing department, a compressed air system, oxygen and acetylene piping systems for the auto shop, a special ventilation system for the refrigeration department permitting complete rapid changes of air in the shops, a warm air heating system for radio communications, a carbon-monoxide exhaust system for the auto shop. This shop also has hydraulic auto lifts, a dynamometer pit, and a wheel aligner.

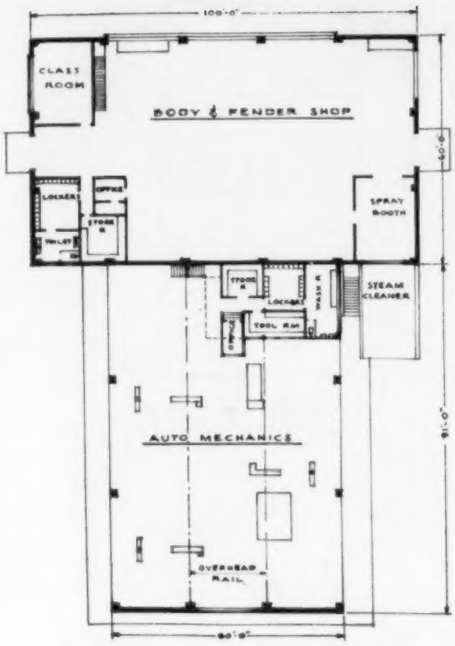
The Cosmetology department offers 1600 hours training for professional cosmetologists.

An electrically driven freight elevator provides easy access for transfer of equipment, materials, and training projects to the second-floor shop departments.

All departments are provided with construction finishes for maximum utilization of each area. For example, plastic folding partitions make it possible to divide the cafeteria into two or three private dining areas which may also double as classrooms. Fireproof decorative draw curtains conceal blackboards in the dining room, and built-in desks and cabinets provide full facilities for this multiple usage. All windows have lightproof shades to permit effective use of visual aids. The dining room windows are fitted with Venetian blinds.

The total cost including plans and specifications, inspections, and certain equipment included in the contract was $1,216,367.13. The buildings alone cost $1,001,158.40. The building was financed by a bond issue.

The total program at Laney Trade and Technical Institute is under the direction of Dr. Spencer Benbow, assistant superintendent in charge of adult and vocational education. Paul Thomas and H. N. Wright, principals of the day and evening schools respectively,



Auto Mechanics Shop Building.

are responsible for the immediate administration of the school, with Thomas W. Cole, as vice-principal of the day-school program.

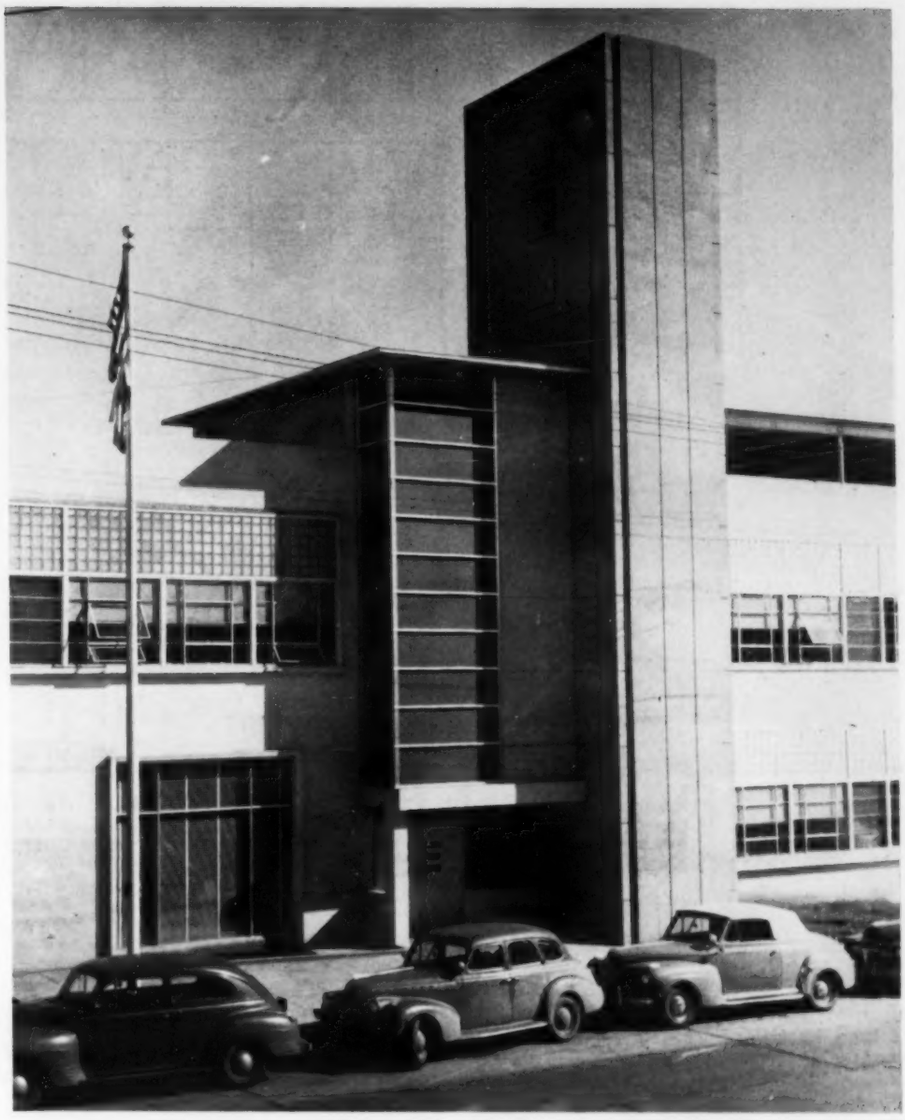
Organization of the Institute

The Laney Trade and Technical Institute was opened as the Central Trade School. Over the years the Institute has gained the confidence of labor and management in the Oakland area to such an extent that in many trade fields only students who have completed the preapprentice classes are hired in these trades.

The Institute is one of the two post-high school level vocational units of the Oakland public schools. Merritt Business School, the second unit, offers business and commercial subjects and prepares young men and women for sales, accounting, secretarial, and clerical occupations.

The trade and technical classes at Laney are organized under the California Plan for Trade and Industrial Education, and the instructors must meet the certification requirements for the program.

The FM broadcast equipment is used for school purposes and for the instruction of students in radio communication.



Entrance to the Laney Trade and Technical Institute, Oakland, California.

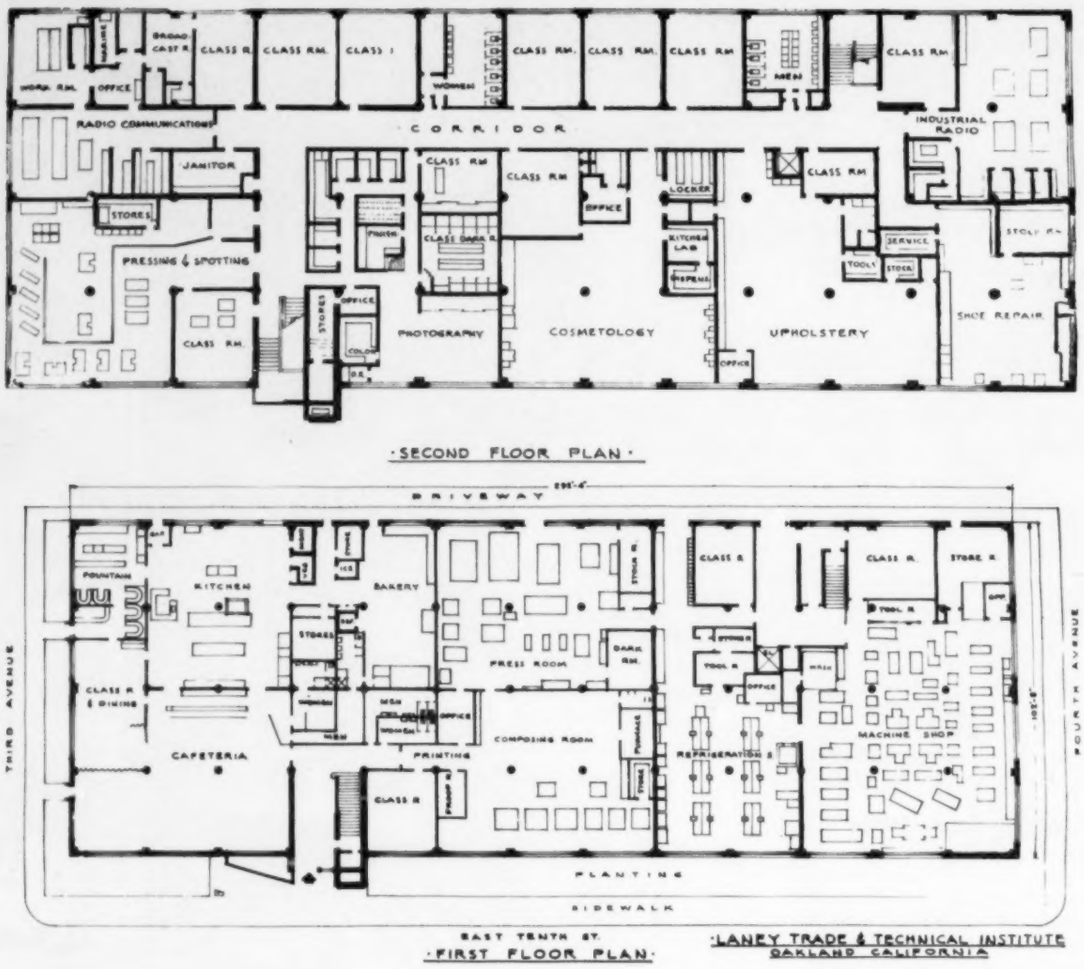
Admission requirements vary for each class and are determined by the employment standards for each trade. Applicants under 18 years of age must either be high school graduates or have satisfactorily completed all required subjects for graduation and be 17 years of age. Students in the latter classification may complete their electives for graduation in the full time academic classes which are parallel and supplement the shopwork. A probationary time of five weeks serves as a tryout and orientation period. At the end of this time students are rated upon "quality of work," "quantity," "punctuality and regularity," and "adjustment to shop procedures" — all ratings conforming to job practices.

Most of the trade courses require approximately one year to complete. New enrollments may be made at any time provided there is an opening in the class. All instruction is on an individual basis and classes are limited to a maximum of 20 students.

In addition to the classes held in the new structures, the school offers in other parts of the plant pre-employment and trade extention training in aircraft engines, aircraft mechanics, diesel engine mechanics, carpentry, drafting and building estimating, industrial electricity, household employment, horticulture and nursery practice, mill and cabinetwork, office machine repair, painting and decorating, plastering, plumbing, sheet metal, arc and acetylene welding.

The two new building units adjoin semipermanent structures for the needle trades. These classes include power sewing, tailoring, alterations and dressmaking, trade millinery and home sewing. Dental assistant training was added to the curriculum offerings in the fall of 1949, and practical nursing was scheduled for the spring semester of 1951.

The courses offered in preparation for state or federal license examinations are fully approved by the agencies concerned. For example, the aeronautics program is approved by the C.A.A. for "A.E.," "A.M." or combination training. Students completing radio communications take the F.C.C. examination, and cosmetology students who meet the require-



ment of 1600 hours training are required to take the California State Board examination for licensing as cosmetologists.

Supplementing the full time training, during the conventional daytime school hours, are extensive programs of trade extension and related technical training for apprentices is offered by the Laney Evening Trade and Technical Institute, in all trades taught in day classes. A partial list of additional apprentice classes includes: auto parts, electroplating, industrial pipefitting, welding, indoor electric wiring, lathing, meat cutting, molding and coremaking, roofing, sprinkler fitting, steamfitting, tool and die making. The following trade extension classes are maintained: auto tune-up and carburetion, beauty shop management, cafeteria management, dental technician, electric code, electric estimating, automobile front end and wheel aligning, paperhanging, spotting, urban horticulture, cake decorating, driver training, electric motor repair, flower show judging, mechanical drawing, and men's tailoring.

A full time trade co-ordinator, an apprentice co-ordinator, and a co-ordinator for the women's trades work directly with the Trade Advisory Committees for each trade, assisting in the interpretation of the needs of the industry and of the school. A fourth full-time co-ordinator assists new teachers and works with the committees engaged in revising the courses of study. The program of the school is constantly changing to keep abreast of new developments and trends in each of the trades. The advisory committees meet at the school, and in most cases the trade and apprentice committees meet once each month. So many jobs are available in each of the trades at the present that the enrollments are sometimes depleted; but even during depression periods of other years the school has consistently found work for all its graduates.

SANTA ANA COMPLETES BOND CAMPAIGN

In June, 1950, the board of education of Santa Ana, Calif., assisted by the administrative staff and the full-day school committee, completed a bond campaign to provide financial help in erecting new school facilities in badly congested areas.

Previous to the bond campaign a number of research studies were made, including population, increase in the number of births, increase of actual enrollment over estimated school population, and number of children enrolled. These figures were used to forecast the total enrollments. The 152 per cent increase in number of births in the preceding decade predicted a school enrollment which seemed almost unbelievable.

During the campaign, it was shown that Santa Ana schools would require 85 additional classrooms within five years. This did not include new families moving into the community, a point which was emphasized.

The original housing program asked for 85 classrooms. These have been reported as 75 per cent complete at the present time. The completed work now includes two school sites, 52 classrooms, 14 lavatories, 4 multipurpose rooms, and 10 kindergartens. In addition new or remodeled storerooms, offices, and service facilities were provided to care for these classrooms.

As of September 1, 1951, a total of $1,130,-325.21 was expended, with $241,843.49 encumbered, or a total of $1,372,168.70 invested to date.

The remaining balance of the original $1,765,000 bond issue has been allocated for 23 additional classrooms at locations where the need is greatest. Four classrooms will be built at the Carl Harvey School, and a new Santiago School is being planned to relieve congestion at two other schools within the next two years.

INSTALL RUBBERIZED GRAVEL AT SCHOOL PLAYGROUNDS

The Culver City School District at Culver City, Calif., has installed a test area of a new pulverized rubber under the playground equipment at the LaBollona elementary school. The new type of surfacing was installed under the direction of Kenneth Johnson, of Architects Daniel, Mann, Johnson and Mendenhall of Los Angeles, intended as a substitute for the former blacktop in general use on the school playgrounds. Two hundred pounds of the rubberized substance was laid in a 40-square-yard area under play equipment on the school playgrounds. The new material is expected to provide a strong safety feature.

Exterior, Highland Park Nursery School, Highland Park, Michigan. — Louis G. Redstone, Architect, Detroit, Michigan.

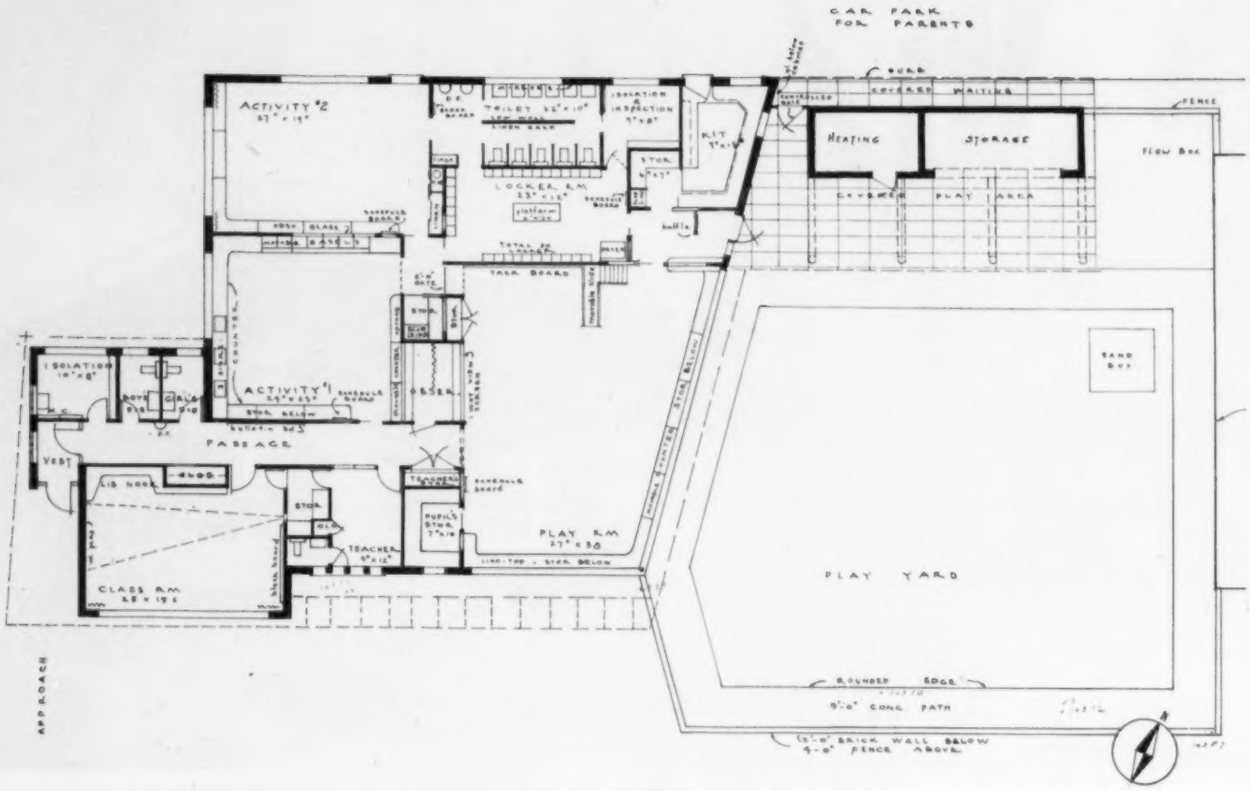
HIGHLAND PARK OPERATES—
A NURSERY SCHOOL, PLUS

Since September, 1950, the Highland Park schools at Highland Park, Mich., have had the service of a Laboratory Nursing School Building, designed to house two groups of small children, totaling 60 tots, laboratory classes of home-economics students in the high school, and parents interested to do a better job of educating their young children.

The Highland Park Nursery School has been operating some years as an activity of the high school social science and home-economics departments. It differs from the majority of nursery schools in that it serves a group of 36 small children each morning and 24 children each afternoon, and in addition, gives senior high school students and parents a chance to observe and to work with these small children, to learn something of their problems, and to try to understand the need of wise training of tots between the ages of three and five or six. A class of psychology students in the Highland Park Junior College are given occasional opportunities to observe the afternoon groups.

Louis G. Redstone, architect of the build-

A corner of the children's activity room.



Floor Plan, Highland Park Nursery School, Highland Park, Michigan. Louis G. Redstone, Architect, Detroit, Michigan.

ing, is authority for the statement that a great deal of research and study went into the planning of this school. Because the school is primarily a Laboratory Nursery School, the plan is laid out in such a manner that the two principal functions (1) a regular nursery school, (2) a training and observation course for students and parents, operate simultaneously and without interference with each other.

In formulating the plan of the school, the educational uses were laid out by the staff of the high school and the central administrative department of the Highland Park Schools. Supt. Max S. Smith gave his approval to the project as a part of the total school program, and the board of education accepted the project as an important unit in its school building scheme.

The playground is furnished with toys and in favorable weather is used quite as much as the activities room.

The Building Plan

The plan is functional and follows closely the flow of activity. The children are brought by car to the rear of the building and deposited under a covered canopy. From there they enter a small lobby and go into the dressing rooms. They are checked by the nurse in the nurse's room adjacent to the dressing room. If approved by the nurse, the children proceed to hang up their outer garments and are ready to go into the play and activity rooms. The students and parents enter the building through the front (street) entrance and proceed to the class (combination lounge) rooms or to the centrally located observation room. From this room they are able to observe and hear the children through special mirrored walls (one-way vision glass) without themselves being seen or heard. This is accomplished by placing sound receiving apparatus in various sections of the ceilings of the activity and playrooms. It is possible to make activity records of indoor play in the observation room through this arrangement.

The building occupies an area of approximately 5000 square feet. The entire structure is fireproof with exposed interior cinder-block walls painted. The ceiling and roof insulation is of glass fiber. The outside is face brick.

Each child has its own towel in the washroom.

The activities room is attractively finished and furnished with colorful furniture.

Numerous built-in features are provided, such as storage closets, motion picture projector room, bookcases, permanent corner seats, dressing lockers. All items directly pertaining to children are scaled to their level.

The use of color was carefully studied and used with good results. For example, a deep red ceiling was used for the canopy and columns of the outdoor play area and pastel greens for the remainder of the canopy around the building. Inside pastel green, pink shades, and yellow predominate.

The building is designed to take advantage of the southern exposure in the main playroom. The heating system is especially adapted for the children's needs — radiant panels combined with window convectors. The ventilating system provides preheated fresh air at room temperature so that at no time is there any variation in temperature. Another special feature is the outdoor covered play area which connects with storage facilities for toy equipment. Here the children can have outdoor play during inclement weather.

Construction Details

Exterior walls — Face brick, stone trim, cinder blocks.
Inside walls — Cinder blocks, painted.
Roof — Steel joists and gypsum covering.
Windows — Steel sash.
Insulation — Roof and ceilings, glass fiber.
Classroom floors — Asphalt tile.
Toilet room finish — Ceramic tile.
Observation room — Inside window — One-way vision glass.
Heating and ventilation — Radiant heat convectors and fan ventilation, providing air at room temperature.
Temperature control — Thermostatic.
Lighting — Fluorescent type.
Sound system — Picku type to enable observing group to hear all sounds arising in playroom.
Plumbing fixtures — Vitreous china.
Toilet partitions — Metal enameled.
Blackboards — Green glass.
Bulletin boards — Wood fiber type.
Contracts — Let in April, 1950; building completed and occupied September, 1950.
Pupil capacity — Sixty children of preschool age.
Cost — Per cubic foot, $1.05. Current school funds used.

Good Visual Environment Obtained in Schoolrooms

Leonard V. James, Fellow I.E.S.*

(This article tells of the need for illumination and brightness control in schoolrooms and how this need was met in a new high school in Naperville, Ill., designed and constructed under the supervision of Thomas J. Higgins Associates of Chicago. Mr. Higgins is a past president of the National Council on Schoolhouse Construction and is Director of Building Survey for the Chicago School Board. Illustrations and observed statistics indicate the excellent results achieved.)

There has been a noticeable change in recent years in the attitude toward the visual environment in schoolrooms used for critical seeing tasks, as determined by the amount, control, and distribution of the lighting and the resulting brightness levels. This has been evident in the modern fenestration arrangements and controls which may utilize the entire outside wall of the room; in the artificial lighting installations which provide several times the amount of illumination formerly felt to be adequate; in the higher reflectances of interior surfaces — blond furniture and trim, light colored floors, green chalkboards, light pastels on the walls, etc. The results have been gratifying — an environment which is much more favorable to seeing effort because of balanced brightnesses in the entire visual field and one in which there are fewer distracting elements and in which the occupants are thoroughly comfortable in a visual sense — a contribution to continued seeing effort, to concentration, to good posture, and to a cheerful attitude.

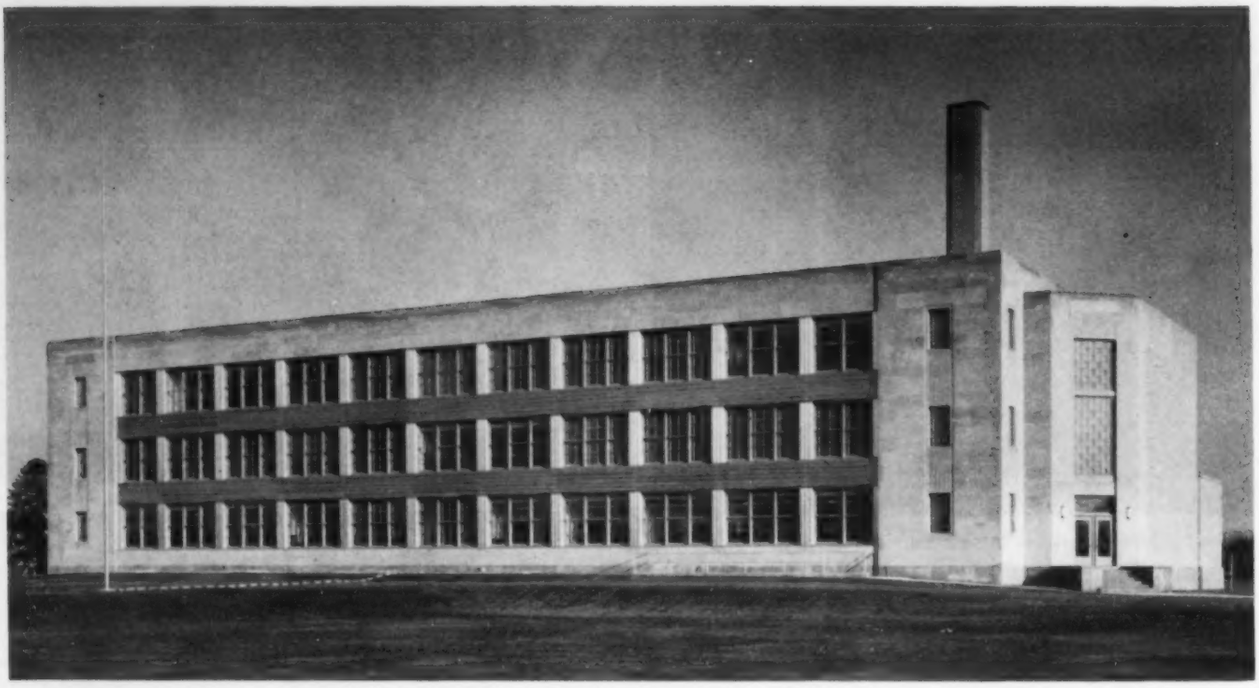
There is a big difference between a room that is merely well lighted, naturally or artificially, and one that is "filled" with comfortable lighting, all elements in the visual field blending into a pleasant, stimulating brightness pattern. And yet the formula for achieving this difference is simple.

The first requirement is an adequate quantity of illumination from natural and/or artificial sources, both without glare, properly distributed over the work and the room surfaces. The second is room surfaces so treated that they reflect this light, diffusely (with no bright images of the source, even though somewhat obscure). This applies to the finish of chalk and tackboards, of floors and window coverings and furnishings, as well as to walls and ceilings. Color is desirable, and it may vary on different walls to create an attractive color pattern. But it must be in light tones or it will disturb the more important brightness pattern.

These things must be the objective of the designer, to accomplish which he must select his daylighting and artificial lighting equipment and controls, and direct the decoration of the interior and the colors of the furnishings.

This was the problem presented to Thomas J. Higgins Associates, Chicago architects, by the school board at Naperville, Ill., in connection with the first unit of a new high

*Engineering Illuminating Consultant, LaGrange, Ill.



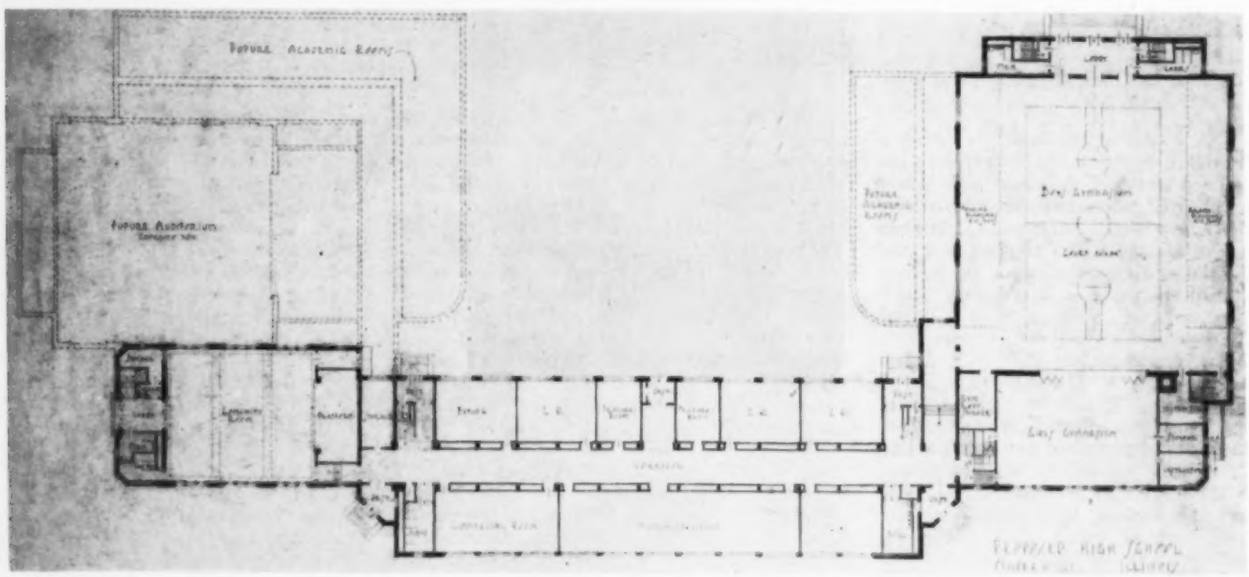
The first unit of the Naperville High School, housing classrooms, laboratories and offices, as viewed from the west. Extensions are to be added, beyond the present structure, for an auditorium, gymnasium, library, and cafeteria. The exterior walls are of limestone and aluminum on a concrete frame, floors are reinforced concrete covered with asphalt tile, ceilings are acoustic tile.

school building. Naperville is a substantial city of some 6000 inhabitants, located 30 miles southwest of Chicago. It is near enough to that metropolis that many citizens find employment there; and yet it is far enough away to have the characteristics of an independent small city — with its North Central College, fairly large industries, important commercial center, and comfortable "single family" homes.

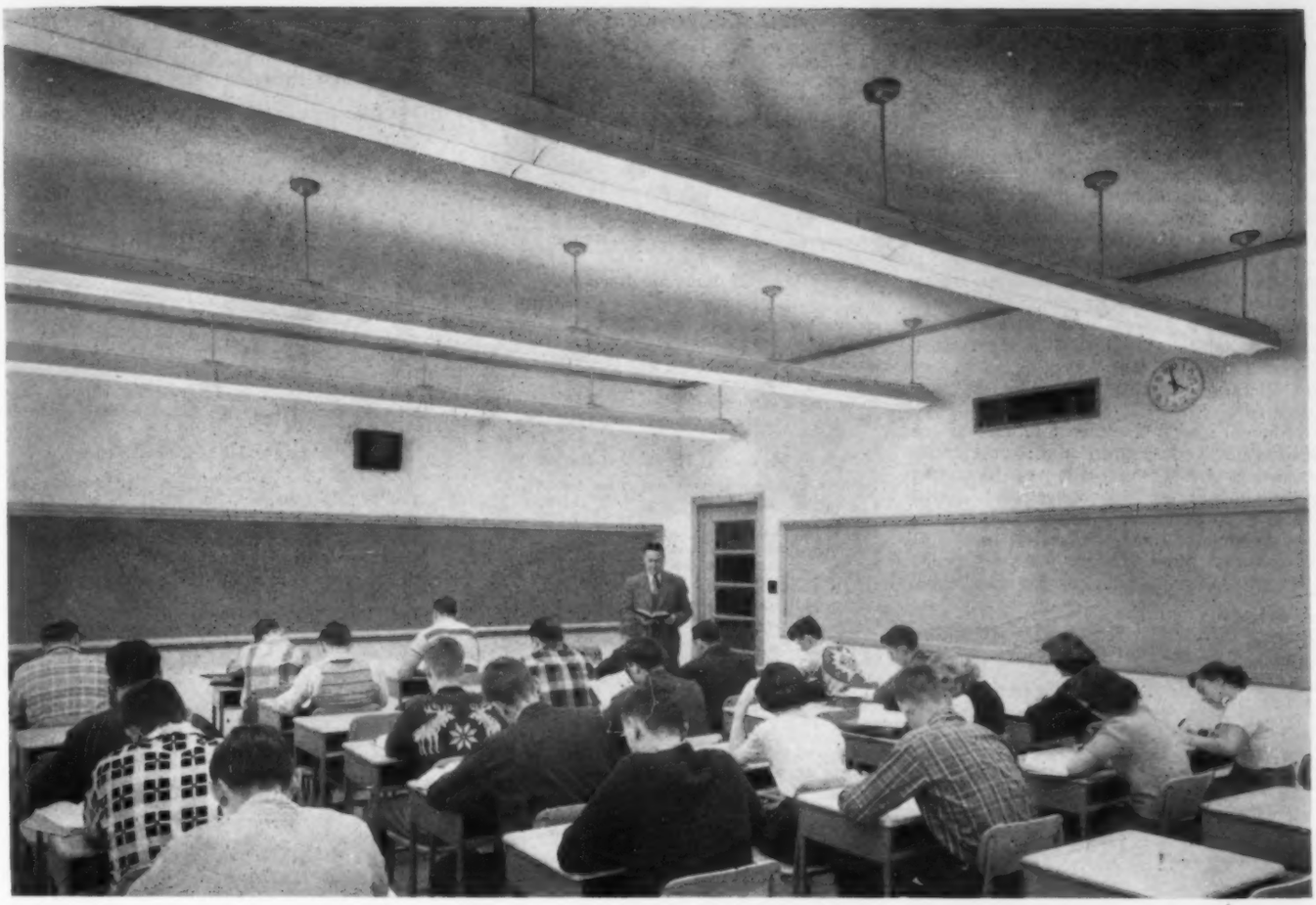
The accompanying illustrations indicate the effectiveness of the solutions. In general, this first unit of the school houses only classrooms, laboratories, and offices. Wings will later be constructed to provide a library, auditorium, gymnasium, etc.; these facilities in the adjoining old building are being used in the meantime.

It is interesting, from a natural lighting standpoint, that the orientation of this first unit is such that the window walls face southeast and northwest, with an open prairie view to the southeast. Since the sun would shine directly into some of these rooms on winter mornings, from a point near the horizon and augmented by snow glare, the matter of fenestration was important. The solution was large windows of flat glass, with Venetian blind control such that light would be directed by reflection toward the ceiling, the direct sun's rays and sky glare being screened from the eyes of those in the rooms.

To supplement this natural lighting and to provide a satisfactory substitute when needed, fluorescent luminaires are employed which produce the same light distribution and absence of glare obtained under daylight conditions, with the advantage of uniformity about the rooms and throughout the day. The rows of fluorescent fixtures are suspended 25 inches over-all from the ceiling. Light from restricted openings at the top illuminates the ceiling and thus reduces the contrast in brightness between it and the brighter lumi-



Floor Plan, High School, Naperville, Illinois. — Thomas J. Higgins and Associates, School Building Consultants, and L. H. Ording, Architect, Chicago.



naires, while it also contributes to the general light distribution throughout the room.

These rows of luminaires are installed crosswise of the rooms. The lamps are well shielded along their sides and there is no glare, but rather a complete compliance with the American Standard Practice requirements. The lamps, or tubes, are *particularly* low in brightness (40-watt T17, cool white, 2⅛ inches in diameter and 5 feet long). The advantage of this is evident in lower image brightnesses, or veiling glare, from calendered paper or other glossy surfaces at the work. This detail is regarded at Naperville as of special significance, as it is felt that glare from below is even more serious than glare from above. Such glossy surfaces should be avoided, of course, wherever possible.

Since the lamps are low in brightness and mounted well above the normal line of sight, cross louvering of the fixtures is not considered necessary even to protect children looking across the classroom. The result is a higher efficiency in light output, much of the downward light from the tubes passing directly to the desks without interference by either reflecting or transmitting surfaces. Maintenance also is simplified. In fact, the luminaire is largely self-cleaning because its light reflecting surfaces are so positioned that they do not support dirt, while they are easily dusted from the floor and can quickly be washed with a ceiling sponge when necessary.

Proper fenestration and control and excellent artificial lighting alone would not be enough to provide maximum seeing effectiveness. Surfaces upon which this light falls must reflect much of it back into the room

↑ Typical classroom, with green chalkboard and buff tackboard, being used for the first time. Note how the room "fills up with light," due to the excellent distribution from the low brightness luminaires and to the absence of harsh brightness contrasts in the furnishings and room finishes.

A corner of the → food preparation laboratory. Note the absence of glare and of objectionable shadows. The suspended luminaires employ only large diameter (T17) low brightness fluorescent lamps, without crosswise louvering, to conserve light and to simplify cleaning. The reflector walls of this luminaire are largely self-cleaning and conceal the lamps entirely, laterally, to more than 40° below horizontal viewing.

and thus create what is becoming recognized as a necessary brightness balance. In this case, the walls are plaster, with near white finish, reflectance 82 per cent; the ceilings are white surfaced acoustic tile, reflectance 78 per cent; the chalkboards, green composition, reflectance 17 per cent; the tackboards, buff composition, reflectance 37 per cent; the desks, blond wood finish, reflectance 45 per cent; the trim, blond wood finish, reflectance 39 per cent; the floor, light green marbleized tile, reflectance 18 to 42 per cent, varying with orientation; the Venetian blind slats, deep cream, reflectance 47 per cent. Just one fault can be found with any of the room surfaces — the laboratory tables are finished in near-black, reflectance 5.5 per cent, resulting in a poor ratio. Because of this, a change is being considered.

Credit for the interesting solutions of the problems involved should not go to the architects alone. John Dolio, Chicago consulting engineer, collaborated in connection with the mechanical and electrical details. The board, led by President Lester Schloerb (Director of the Bureau of Pupil Welfare for the Chicago public schools) and Supt. Ralph E. Beebe,

Brightnesses of surfaces about the room are measured with a brightness meter, in which these are compared with a variable standard of brightness inside the telescope of the meter.

were most understanding and co-operative. All have been pleased with the result.

After the building was in use, it was decided that the author make a complete lighting and brightness survey and report for two representative rooms, one a classroom facing northwest and the other a biology laboratory facing southeast. Direct assistance in this survey was rendered by Principal Robert Van Adestine and by R. E. Holland, instructor in physics at the school, while Walter A. Meares and Paul H. Fisher, illuminating engineers in Chicago and Wheaton, Ill., respectively, collaborated in some of the work. Joseph Soucek, of Schube and Soucek, Chicago commercial photographers, arranged the occupants for the pictures.

Most readers will be interested in the general results of the survey, given in the tables — more complete detail is available on request.

Since nothing is perfect, careful observation should discover details even in these excellent rooms which might be improved. Two matters stand out. One is the dark tops on the laboratory tables, introducing large visual areas, in the eyes of the students, which are greatly out of balance with the general field and particularly with the average task (12.7 to 1, task to table, as compared with 3 to 1 recommended). With modern materials now available, more impervious to chemical solutions and to scratches, it would seem that lighter finish surfaces should replace the old-style black impregnated wood tops.

The other fault is the sky and snow brightness as seen through the lower window areas when the blinds are adjusted to leave vision strips. Whether interior control devices are elevated to allow for these openings, through which to look out through the windows, or the strips are built into structural glass walls, but little light would be lost if colored glass should be used at these points, to correct this serious imbalance of brightness and still permit reasonably clear vision.

The Naperville High School is a good example of modern school design construction

(Concluded on page 88)

The same meter and a magnesium disc of known reflectivity are used to measure footcandles as desired. The brightness of a surface as measured, divided by the footcandles delivered to that surface, determines the reflectance of the surface.

TABLE I. Classroom Findings

The classroom is 21 ft. 10 in. by 28 ft. 4 in. with an 11-ft. ceiling. Orientation is to northwest exposure. See text for room reflectances.

Illumination and Brightness Observations (See Note)

	Artificial Lighting Only (1)	*Natural Lighting Only* (2)
	1/20/51	2/17/51
Observations made	4–5 p.m.	12–1 p.m.

Illumination Levels

Average on desks	59	93
Maximum on desks	70	264
Minimum on desks	47	33
Maximum on chalkboard	41	183
Minimum on chalkboard	30	43
Maximum on tackboard	45	71
Minimum on tackboard	32	61

Maximum Brightness Ratios

(observed from rear center seat)

Task to desk	1.6– 1	1.6– 1
Task to chalkboard	8.7– 1	11. – 1
Task to wall above chalkboard	2. – 1	1.6– 1
Task to wall below chalkboard	3.2– 1	2. – 1
Task to tackboard	3.6– 1	2.1– 1
Task to wall above tackboard	2.3– 1	1.4– 1
Task to wall below tackboard	1.7– 1	2.6– 1
Task to blinds	3.3– 1	1. – 3
Task to wall above blinds	head at ceiling	
Task to wall below blinds	2.7– 1	2.3– 1
Task to ceiling	2.4– 1	1. – 2
Task to floor	2. – 1	11. – 1
Task to luminaire, front view	1. – 9.6	1.8– 1
across room (est.)	1. –17	
Maximum, luminaire to ceiling or wall beyond	23.5– 1	
Maximum, sky (as seen) to adjacent wall		53 – 1
Maximum, luminaire (front view) to least bright surface in room	83 – 1	
Maximum, between other room surfaces	14. – 1	32. – 1

NOTE: American Standard Practice recommends a minimum illumination level at desks or boards of 30 footcandles; also a limiting brightness ratio from task to desk of 3–1, from task to more remote surfaces of 10–1 to 1–10, and from luminaire to ceiling or wall beyond, also from sky to adjacent wall, of 20–1. National Council on Schoolhouse Construction recommends a maximum ratio between the most and least bright surfaces in the field of view of 50–1.

TABLE II. Biology Laboratory Findings

This laboratory is 21 ft. 8 in. by 36 ft. 9 in. with an 11-ft. ceiling. Orientation is to southeast exposure. See text for room reflectances.

Illumination and Brightness Observations (See Note)

	Artificial Lighting Only (3)	*Natural Lighting Only* (4)
	2/17/51	2/17/51
Observations made	5–6 p.m.	10–11 a.m.

Illumination Levels

Average on tables	47	45
Maximum on tables	59	57
Minimum on tables	37	24
Maximum on chalkboard	33	46
Minimum on chalkboard	24	24
Maximum on tackboard*	23*	72*
Minimum on tackboard*	18*	72*

Maximum Brightness Ratios

(observed from rear center seat)

Task to table (desk)	12.7– 1	12.7– 1
Task to chalkboard	8. – 1	7.8– 1
Task to wall above chalkboard	2.5– 1	1. – 2.5
Task to wall below chalkboard	3.8– 1	1.9– 1
Task to tackboard	3.1– 1*	2.6– 1*
Task to wall above tackboard	2.9– 1	1. – 1.6
Task to wall below tackboard	3.1– 1	1. – 1.9
Task to blinds	4.1– 1	not taken
Task to wall above blinds	head at ceiling	
Task to wall below blinds	5.7– 1	7.9– 1
Task to ceiling	1. – 2	1.5– 1
Task to floor	3.1– 1	5.9– 1
Task to luminaire, front view	1. – 8.2	1. – 1.4
across room (est.)	1. –21.	
Maximum, luminaire to ceiling or wall beyond	21. – 1	
Maximum, sky (as seen) to adjacent wall		167. – 1
Maximum, luminaire (front view) to least bright surface in room	66. – 1	
Maximum, between other room surfaces	16. – 1	61. – 1

NOTE: See note following classroom table.
*Tackboard here is small and in rear corner, where vertical artificial lighting is low. Side wall chalkboard was observed instead in the daylight test.

$50,000,000 Worth —

Good Will in Education

*John F. Delaney**

Educational public relations is rapidly taking its rightful place in the publicity and advertising profession of the nation. It has become a service to the people and a godsend to the schools of the United States.

The recently successful campaign of the Chicago board of education for referendum approval by the voters of a $50,000,000 school building bond program presents an impressive example of tangible results from modern public relations methods.

For more than six years — since the organization of the Bureau of Public Relations of the Chicago public schools — an average of 450 news releases have been issued annually to 145 news outlets in the metropolitan area of the Windy City.

These releases have gained the good will of citizens, students, parents, and taxpayers by making them a thoroughly informed partner in a publicly supported quarter-billion dollar educational corporation.

The Big Bond Campaign

By being so advised of educational needs, aims, plans, and purposes these public partners of the Chicago board of education became the "shock troops" in the $50,000,000 campaign. They all but overwhelmed opposition to the rehabilitation and expansion of this public school system.

All are familiar with the extensive press services of the Associated Press, the International News Service and the United Press.

The 730 large city public school systems of the United States can bring about better public relations in their localities by a knowledge of the public relations services of the bureau that directs these functions for the Chicago public schools.

This bureau, with a complement of a director and five subordinates, has written a record of good will for education in Chicago unsurpassed by governmental, commercial, or educational institutions in the nation.

Its 1950 record of achievement reflected in the monthly reports of Dr. Herold C. Hunt, general superintendent of schools, gives an all-the-year-round news service which compares educational with national news services referred to above.

A Commendable Record

The Bureau of Public Relations functions as a part of Chicago's Fourth Estate. Its director, in daily contact with local editors, offers news articles, photographic tips, and expert advice or information on local or national education data by, at times, preparing or reporting special stories for newspapers, magazines, radio, and television.

During the 1950 school year, the record shows the following figures:

News releases ..... (sent to 49,880 outlets)	494
Clippings or articles printed..	2928
Photographs	935
Daily average news releases..	2.42
Articles printed	14.14
Photographs	4.61

These figures contain clippings obtained by the Bureau. (There is no organized source for receiving all clippings.)

More than 110 community and foreign-language papers also receive this service.

The evolution of the Bureau of Public Relations of the board of education is an interesting and informative chapter in the educational history of Chicago.

Gaining a Good Press

Prior to 1945, the Chicago board of education had a "bad" press. This is not strange. Many of the 20,000 employees took it upon themselves to act as public relations representatives. The old adage of "everyone's business is no one's business" was characterized in the 400 schools and 60 administrative departments.

Hours were squandered correcting news items from these unauthentic sources. Newspaper reporters bent on gathering news material lacked a central point to secure authentic data. There was no organized plan for supplying school news. Authorized current matter was only obtainable at board meetings held every two weeks.

Four hundred twelve public schools make news of interest to the press. This news was arriving by way of detour.

On January 8, 1945, the Bureau of Public Relations came into being. It was designed by the members of the board of education, after three years of study, and was located adjoining the office of the president.

Things began to happen. Each administrator, department head, principal, and teacher was acquainted with the bureau. They were instructed that official news releases pertaining to school board matters must clear through the Bureau of Public Relations.

It was only days until the chaotic public relations practices in vogue became a thing

(Upper left) Tad Lincoln, editor of the "Brown School Holiday Budget" in 1866. His memory aided in the success of the school building bond issue. The Brown Elementary School built in 1857 will be replaced by a new building because of the success of the Chicago $50,000,000 school bond issue. Tad Lincoln and Lillian Russell attended here.

*Director of the Bureau of Public Relations, Chicago Board of Education, Chicago, Ill.

Sixty-three sets of twin high school graduates who launched the 1951 public relations feature for Chicago Public Schools.

of the past. The newspapers applauded the ease with which reporters were able to complete their stories in co-operation with this new bureau.

An unforeseen incident then brought about one of the most widespread public relations campaigns ever conducted by a public school system. It happened during World War II, when newspaper space was at a premium.

The First School Building

A contemporary of the board visited the bureau's offices. During a discussion he casually remarked that the first Chicago public school, built by the board of education, was the Dearborn School at State and Madison Streets.

After the visitor left, the history of the Dearborn School was digested. It had been built in 1845 — just one hundred years ago.

During that year, the Centennial of the 1845 schoolhouse was celebrated. The idea was used to bring about a better public-relations situation throughout the city. Every locality in Chicago was encouraged to celebrate the birth and progress of its public school; pupils, parents, businessmen, and commercial organizations participated beyond expectation.

Columns of news material emanated from all parts of the city. Local programs were offered in varied forms. National news columnists, headquartering in New York, wrote columns of the educational centennial in Chicago. Motion-picture news releases circulated nationally; radio broadcasts featured the event. All in all, the Chicago public schools gained a "good" press from one end of the nation to the other.

About this time, another innovation in public relations was instituted. This too received national focus.

A Visitation Day

In scanning the list of Chicago high school graduates, it was noted that more than one pair of graduates in some schools bore the same surname and address. These were twins. A questionnaire revealed that practically all sets of twins — there were 63 sets — had begun kindergarten 13 years before. Nearly all maintained equivalent grades throughout their school years and had received like graduating marks.

Here was an implication of commendable public school education. The practice of bringing high school graduating twins together at each commencement became a semiannual feature for newspapers, radio broadcasts, and television.

In 1949, a Visitation Day for the educational chairmen of the PTA was inaugurated and has become a yearly event. Because some parents thought an effort was being made to bar them from visiting schools, classes and administrative offices, an effort was made to prove that the contrary was really the intent of the board.

Now, one day each year is PTA Visitation Day, but mothers or fathers are welcome any day. The PTA educational chairmen are invited to the central offices of the board to digest the operations of departments in which they are interested.

The day is divided into 30-minute periods, and the group into six units. Ushers guide these groups to different divisions of the central offices. Working details of personnel, child study, radio, placement counseling, library, and exceptional children are presented by persons trained in these educational features. When the tour is over, each visitor has attended six different administration departments. More than eighty PTA members attended on last Visitation Day.

Present Publicity Opportunities

Just a few of the public relations campaigns which present annual opportunity follow:

Semimonthly meetings of the board of education.

Scholarships to hundreds of high school graduates to schools throughout the nation.

Opening of school year — attendance, new curricula, improvements and rehabilitations are of public interest.

Breaking ground for new schools is always of interest to news, radio and television sources.

Cosmopolitan make-up of classes, which emphasize Americanism, center interest in the public schools.

DON'TS FOR SCHOOL PUBLICITY

Don't try to hoodwink the editor or reporter — he attained his goal because of training and experience and dislikes a fakir.

Don't whine and plead for valuable news column space. If your release is newsworthy, you won't have to.

Don't send out a release if you are not sure of your facts — you'll only embarrass yourself and a friendly public relations outlet.

Don't try to assume the editor's prerogatives — he is an editor because he knows how to edit.

Don't try to demonstrate the use of polysyllables in your copy. Down-to-earth copy travels farther.

Don't bother the editor with unnecessary telephone calls — let your release tell the story.

Don't arrange photograph appointments unless you know they will be kept.

Don't tell a photographer what you want photographed on a story.

Don't high-hat or snub an editor, photographer, or reporter.

Don't appear to think you know it all.

Vocational activities interest many. Rehabilitation and rebuilding of wrecked airplanes as shop practice portray the expert training given by the Chicago Vocational Schools.

Braille teaching in high schools has centered interest on this phase of education. It is not rare for a Braille student to win a university scholarship.

Americanization classes, variously located throughout the city furnish an annual series of human interest stories.

An annual mathematics contest for high school students causes more than passing interest on the part of the public.

Midyear commencements center attention upon the schools of Chicago.

Many more programs for students, parents, and others interested in public schools have been organized by the Bureau — but not until it became necessary to go to the people as a whole, were the results and good will of the public relations' activities, of the past six years, so evident.

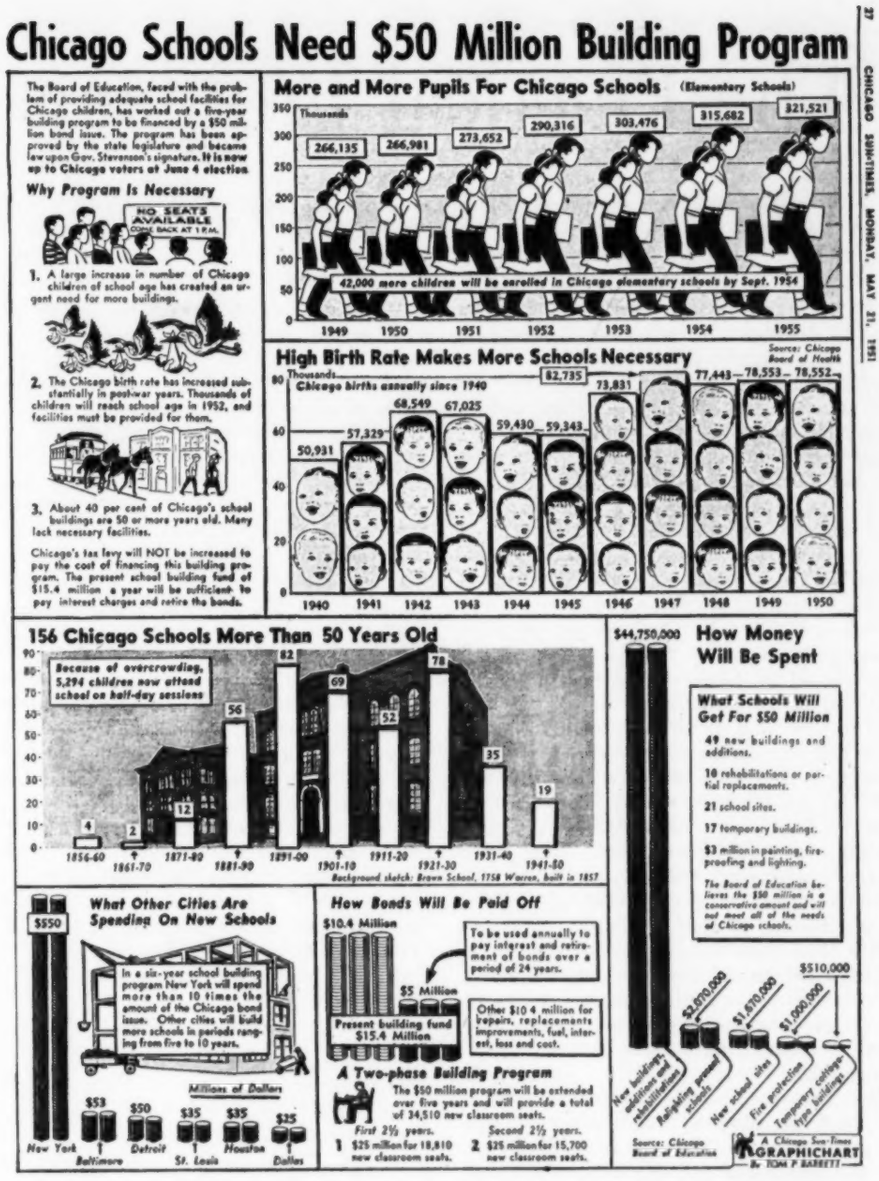
Bond Campaign Authorized

The Building Committee of the Chicago board of education studied the needs of Chicago schools. On March 1, 1951, John Doherty, chairman, and his committee, made up of Frank M. Whiston, vice-chairman, Dr. Robert S. Berghoff, W. Homer Hartz, Catherine C. Mulberry, Frayne Utley, Herold C. Hunt, Frank R. Schneberger, and Architect John C. Christensen submitted a report recommending that the board authorize the principal and interest of a $50,000,000 building bond issue which would take care of the most urgent needs of the Chicago public schools. The board adopted the report.

The first hurdle was the legislature — the passage of laws which would permit the voters to express themselves upon the program.

After several sessions at Springfield, the legislation was passed. It awaited the signature of the Governor. The Governor was prevailed upon to sign the bills in Chicago.

John Doherty
Chairman of the Chicago Board of Education Building Committee, and official of the United Steel Workers Union.



One of the full page diagram charts published by Chicago newspapers during campaign for $50,000,000 school building bonds. Data was supplied to newspaper by the Bureau of Public Relations.

Simultaneously with the signing of the law by the Governor, a *Newsweek* interview with General Superintendent Hunt on the school building bond issue appeared in that magazine. This gave national importance to Chicago's rehabilitation program.

In the interim, Dr. Hunt appointed a campaign committee of six members which functioned during the campaign. Meetings of principals and teachers were held in high schools to discuss details of the building bond program. In this manner, authentic reports were sent back to each Chicago community. Principals and teachers arranged meetings in their localities and presented complete information to the citizens.

Step by step, Dr. Hunt guided the progress of the campaign — the main appeal being a plan to finance the bond issue without increasing the tax rate. Newspapers, radio, and television co-operated wholesomely as they received 2175 news releases on the building-bond activities.

Newspapers Gave Help

One Chicago daily newspaper printed more than six full sized Sunday edition columns, based on a map especially prepared — showing just what improvement each of the five sides of the city could expect.

Another newspaper carried a full-page chart with illustrations advising the citizens of the pressing need for the school improvements.

More than 56 full sized newspaper pages of details and pictures were printed in Chicago papers during the campaign. Among these, was a story of the first elementary school newspaper, edited and printed by Tad Lincoln,

(Concluded on page 94)

The Practical Problems of Acoustics

*H. W. Schmidt**

The American public likes nothing better than to stress certain features of its otherwise daily reactions to thoughts, materials, and performances and to hang these features on the national washline for all to see and to comment upon, and then to forget all about them until another occasion arises for similar or like displays. So we have tag days and flag days, and cheese days and Mothers' and Fathers' days, and English week and Peace Day and safety days, and so on *ad infinitum* and *ad — no —* you didn't guess that one — I mean *ad absurdum.*

But you will notice that among them we have not mentioned one which had or rather has reached quite deeply into our conscience, and that is the attention to noise. We have had no "No Noise Week" or even day; but we have had elimination and abatement societies and every once in a while we have a public outbreak against noise — horn blowing, open automobile cutouts, locomotive whistling, riveting, air drills, heavy truck traffic, news hawkers, and what not. Because these are common noises many of them have been, if not abated, at least diminished. We certainly have become noise conscious even if we have had no public observation day about its diminution. Noise is no longer a necessary factor denoting industry or production; just listen to our present, and past, political campaigning!

But there are some "noises" which are not quite so obvious and in this measure are probably more difficult to deal with. These are the noises, the sounds, about which this discussion will center, and as most readers are connected with some institution, the schools, we shall confine our attention to this one phase of the subject.

Common School Noises

Aside from noise consciousness as such, the school man is confronted with certain specific noises, many of which are of comparatively recent origin due to the subjects taught in our modern curriculum and which lead to high noise levels, such as those incurred by the activity program all along the line: by typing, by the multifarious activities of the many shops, including sheet-metal work and auto mechanics and the newest addition, aircraft work. Then we have band and orchestra work, plus their "obnoxious" but necessary practice work, the gymnasium activities, etc.

These noisy activities are aggravated by their "sound effects," to borrow a term from the radio industry, due to our modern building construction of concrete and steel and hard plaster, terrazzo, and other enemies of sound reduction, to say nothing of long corridors, the multiplicity of large room areas, of shops, laboratories, auditoriums, and gymnasiums. The shifting of hundreds of lively youngsters from room to room five or more times a day, does not make the situation any better either.

Then, of course, we are aware of the fact that schoolwork calls for concentration, mental concentration let us hope, which certainly is not improved by noisy surroundings or by unwanted sounds which penetrate an individual's consciousness. All this leads to distraction, lack of mental effort, and dissipation of thought. In large doses such sounds or noises are definitely enervating.

So we are required to take cognizance of this situation or problem, and it should be someone's business to solve it, if possible, in the interest of surroundings conducive to better educational work. This simply means, in plain language, that the acoustical defects of a building or certain areas, should be corrected and proper treatment given such offending sections so that these may no longer give rise to disturbing sounds.

Some Fundamentals

To understand well the following practical applications of acoustical treatment and its underlying principles, the writer will try and give a few of the primary and fundamental facts, and explain some of the terminology, much of which the reader will probably remember from his school-day science lessons. So far we have not used any exact terminology, but we shall do better hereafter.

In the first place, we are dealing with sound, not "noise." The physicist defines sound as, "a form of vibrational energy which affects the ear and its mechanism and thus stimulates the auditory nerve." (Is the writer "carrying coal to Newcastle"?) But the vibrations which stimulate these nerves are quite limited; very few ears can "hear" vibrations less than 16 or more than 21,000 per second. Now if these auditory impulses come at regular or rhythmic intervals we usually say that they produce "musical" tones, pleasing to the ear. But if they come at irregular intervals, out of step, so to speak, then these vibrations produce what is commonly called noise. This term is a subjective one and we do not all agree on what is noise or what is music. What is pleasing to one may be anything but that to another. In general, we do distinguish between the two in the above accepted sense. The Acoustical Terminology of the American Standards Association defines noise as any undesired sound. That certainly opens the floodgates of subjectivity.

Again, most of the sounds we hear are transmitted through air, a comparatively very slow process. The velocity of sound waves in air at 70°F. and 45° relative humidity is very close to 1165 feet per second, as compared with about 16,000 feet in steel and 5000 in water. All elastic solids, and their number is very large, transmit sound rapidly and easily.

These sound waves spread spherically, that is, in all directions and for great distances (theoretically infinitely); but their energy diminishes very rapidly and finally is too small to affect the ear, though there are devices which can "hear" beyond the range of the human ear.

Sound Wave Energy

When these waves are confined what happens to their energy? What is the effect upon the surroundings in confined spaces? Of course you say, "I know what happens; the sound dies out, or it just quits, or you get echoes, etc." Maybe, but the fellow behind is likely not satisfied with that answer, so let us follow *him* and see what he has to say.

If a sound is produced, say in a room, the waves are sent out in all directions and the result is threefold. The sound waves are either reflected in part, or they are transmitted through the confining surfaces, or they are absorbed. All these three processes go on at the same time and the effect upon the audience, we shall take it for granted that there is present an audience or at least an auditor, depends upon which of the factors predominates. To back up on the thesis, if the waves are totally absorbed virtually nothing is heard but the minute effect of the original sound waves striking the ear; if all the sound waves were transmitted through the confining structure, the effect would be similar, but the fellow on the outside would get an earful. If all waves were completely reflected, you would wish yourself away from that pandemonium, especially if the original sound waves had considerable amplitude. Fortunately none of these effects is complete. A simple analysis will show what really, and usually, happens.

When one speaks, the sound waves emitted strike all exposed surfaces and the surfaces which are elastic and hard *reflect* the original sound waves in so many ways and directions that you can say that this room is filled with sound. But if conditions are right (of this more later) nearly everyone can hear

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plainly anyway. But suppose the smooth reflecting surfaces are so expansive and so little absorbent that instead of absorbing some of the energy of the waves, these are continually and almost wholly reflected until they finally die out — then we have one of those familiar nuisances found in many halls and other large spaces — reverberation. The effect is simply due to one sound wave attempting, and too often succeeding, in catching up with another one or two or a whole flock of others. Thus, instead of the ear receiving relatively pure sound waves, it gets a job-lot of them and confusion of sounds results and one has difficulty in understanding the speaker. May we hope that is not the case here, even if the writer is not speaking in a literal sense.

Echo Not Reverberation

Do not confuse this effect of reverberation with an echo, in the accepted sense, that is one sound followed by a like sound and reaching the ear sufficiently far apart to be recognized as the second distinct sound. This may happen if a wall, usually a rear one, is far enough away to reflect the sound wave so that it reaches the ear about $\frac{1}{10}$ of a second or slightly more after the original sound wave has affected the ear; there will then be two distinct impressions of the same sound — disturbing but not uncommon. However, this rarely occurs in any but very large spaces. Reverberation is still the *bête noire* here.

One other effect may give rise to some difficulty. What becomes of the energy of the sound wave? It may, and sometimes does, produce an effect known as resonance, a kind of first cousin to reverberation. If a sound wave strikes an elastic surface, such as a wall, it pushes the wall in. Yes, it does. Very minutely, it is true, but "in" nevertheless. Now, if these impulses come at the correct intervals, in a rhythmic manner, each wave gives another "shove" and finally the surface may vibrate at the same rate as the original wave, and "presto," we have a "speaking wall."

This gives rise to some interesting phenomena, not always recognized as to their causes, but disturbing just the same. It may result in "booming" the Sousaphone or the kettle drums or even the "big bull fiddle" in large spaces due to the large energy of the sound waves from these and similar instruments. In smaller rooms the pitch is apt to rise and accentuate high pitched instruments or a shrill voice.

A speaker who is cognizant of these facts usually attempts to change the pitch of his voice and thus is likely to be heard to better advantage. You can now see that shouting makes the situation worse.

Though there are other factors that enter into the problem they are of minor importance and need not be discussed here except to mention the transmission of sound through various types of construction. This of course does take place, and such transmission, especially through flimsy walls, ducts, doors, wooden floors, etc., introduces problems with which one must cope at times.

What Is a Decibel?

It may be, before these statements about fundamentals come to an end, and we discuss the practical applications of these basic matters to local problems, that it would be wise to briefly discuss a modern term which is glibly used by the tyro and about which he, as a rule, knows but little. This term appears frequently in lay literature dealing with acoustical matters — that is the "decibel." If one were scientifically inclined he would find the definition of a decibel as, "One tenth of a bel, the number of decibels denoting the ratio of two amounts of power being 10 times the logarithm to the base 10 of this ratio when conditions are, etc." Whew!

For us the decibel is simply a unit for measuring the loudness of sound and its steps or number corresponding to the difference in loudness, one step or number being the least distinguishing difference. The zero of the scale is absolute silence, not obtainable. Ten decibels correspond in loudness to the rustling of leaves in a gentle breeze; a whisper about four feet away will have a sound level of about 20, and ordinary speech usually ranges around 50 decibels. The New York subway gives about an 80 decibel reading, an airplane 90–95, while 108 dbs. is about on the threshold of feeling: i.e., the sound is so intense that it hurts, as one observer remarked.

The average sound level of a schoolroom, "when quiet," is 40 dbs., and when a recitation is going on it will probably rise to 50 or more; kindergartens can do better. The sound levels may be measured instrumentally through very sensitive microphones and an arrangement similar to a radio-receiver-transmitter. But for the average work we do not need such refinements except in case where such is warranted, not usually met with in schoolwork.

Let us now see how all this ties in with the problem of acoustics, correction of defects in many cases, and how we may apply what we already know or what we have heard about.

Practical Noise Control

As stated before, noise or even music may be a distracting element for school children and a quiet atmosphere is decidedly better for the school and its rooms than pandemonium or even sound levels of 60 or 65 dbs. Of course we *are* more noise or sound conscious than we were 25 years ago, due to the results of comparatively recent studies and research into this field, our advances in and refinements of psychological investigations and other factors, aside from the more obvious acoustical defects of auditoriums, study halls, and libraries. So, there *is* an accumulation of evidence in favor of correcting such defects, as defects they are on the basis of our attitude and present discussion.

It is now evident that the only practical way of eliminating these disturbing influences is either to change our methods of construction, and make use of construction materials acoustically more or less inert or apply such materials to our offending surfaces. The former are not too easily taken care of though in large halls and structures careful design *may* produce satisfactory results. The latter procedure is much easier, less expensive, comparatively easily calculated for. Best of all it may be used in older buildings, and in fact is now very common in even new and recent structures. We will confine the balance of this paper to remedial procedures in existing buildings.

It is clear, of course, that the worst offenders acoustically are reverberations and echoes, due to reflection from elastic or sound reflecting surfaces. We can reduce the former to a point where they will prove satisfactory. But it is to be remembered that reflection also produces good "sound filled rooms," increasing audibility and "understanding" — so reflection like all good things is beneficial in proper doses, and decidedly contrariwise if overindulged in. So we must find a measurable factor, known as the reverberation period or time. If this factor is too great we get minute echoes and a jumble of sound; if it is too small we get a flattening or deadness of tone, disturbing alike to speaker and listeners. The factor is dependent upon the size of the space and the type of sound; it may be greater in a large room used for music, especially instrumental work, than in a small space for a speaking voice. The range is from about 0.9 seconds for a room of about 10,000 cu. ft. volume to about 2.5 seconds for a volume of 1,000,000 cu. ft.

How to Spoil Band Music

One tendency has been observed in field practice and that is to provide too much correction for band or orchestral work. In such cases a slight overlapping of sound is desirable as this tends to produce brilliancy — "enunciation" is not a requirement here as in case of speech. But if we overcorrect we not only reduce this desirable effect but we kill off the overtones which after all produce quality effects. The fundamental tones of the instruments come through, but the overtones, having small amplitudes, are thus more readily absorbed and shadings and quality suffer badly. One case is known to the writer where students had difficulty in tuning their instruments because of overcorrection.

If we know or decide upon the reverberation period desired, know the sound reflection coefficient of all surfaces and their areas, including the factors due to the occupants, and the volume of the space, then we can provide conditions which will satify "Sabine's" formula still commonly used except in special cases calling for more than ordinary refinement of measurements or correction. It is as follows: $T = \frac{0.05 \times V}{A}$, where T is the reverberation time, V is the volume of the space; A, the coefficient of absorption. This formula is not 100 per cent correct but usually gives fairly acceptable results. It is now evident that the real variable is A, or the total amount

of absorption. If all the factors present, in their summation satisfy T, then as a rule no correction need be made — but that is not at all common. If the summation or A is too small, as usually is the case, then by adding the proper amount and kind of material we can get the correction. But what to use or not to use or where to use, that is the question.

What Materials to Use

There are on the market probably dozens of kinds of acoustical materials including plaster, fabrics, fibers, boards, tile, and what not. But their effectiveness as sound absorbers is extremely variable — and "there is the rub." Their coefficients vary with the pitch of the sound to be controlled and usually are calculated and given for octaves, ranging from 128 vibrations per second, low C, to 2048 for third high C; the lower pitch has the lower coefficient, but we commonly use 256 as a median. With this pitch the variation in coefficients is from 0.08 to 0.98 according to one of the acoustical materials bulletins, and of course depending upon the material.

What to use? One has plenty of choice both as to material and cost. It sometimes happens that the treatment surfaces available are limited in area and the sum total of correction with a material having a coefficient of say 0.34 does not bring the value of T in our formula to the point desired; then we must use another material with a higher absorption coefficient. This may or may not be more expensive, but usually is. But in that case you have no choice.

The color of the material used may also be a factor, as acoustical treatment is not the only consideration. In that case the choice is quite a bit limited as many materials have undesirable colors and may not be painted or decorated without losing much if not all of their acoustical value. Surface porosity is depended upon, in most cases, for absorption effects, and decorative treatment often ruins the material in this respect. The writer can recall two instances. One was a music room which received proper treatment with a "shredded" or fiber material; the results were good but the color did not suit. So some smart chap conceived the idea of spraying the surface with paint. The result? Eighty-five dollars for additional expense replacing the material and $25.50 for painting, a total of $110.50 for the experiment.

In another instance the original gymnasium ceiling received acoustical covering calculated for properly, but someone did not like the color, so had the ceiling painted. The original coefficient was 0.47, the final one 0.28, and the result can be imagined. Then wires were strung across the ceiling, "to cut the sound waves," a procedure quite in keeping with the above brain storm — ridiculous. The final result was the application of $850 worth of high grade acoustical material.

Common Sound Correction

The matter of sound transmission through walls is also too often lost sight of, and the strategic replacement of materials may often correct this. In one case a high coefficient material was used on the ceiling of a large music room and results were fair. But one wall, a very long one, gave both transmission and resonance effects. A cheaper, lower coefficient material for both ceiling and walls would have been better; the wall had to be treated, incurring additional expense, and the result reduced the reverberation time to such a low level that virtually all brilliancy of the music was lost. However the *transmission* was corrected.

The commonest form of acoustical correction in most classrooms is treating the ceiling; in the first place this is usually a large unbroken area with a construction and surface both of which are good reflectors and resonators. The walls are frequently broken by windows, blackboards, trim, etc. By applying acoustical materials to the ceiling, easily done, we can probably reduce our reverberation period to a satisfactory one. Of course windows, or rather the glass in them, is a fine reflector of sound but we can do nothing about that, so the ceiling change will help us.

In shop areas the problem is slightly different; here we are confronted with two factors — reducing the noise level and reducing noise transmission. The former can readily be accomplished by means of absorbent ceiling and wall treatment which in turn also partially reduces noise transmission; so we kill two birds with one stone. But if we reduce the noise level we may still have to provide extra correction for reducing transmission effects. But this does not necessarily call for *surface* treatment but rather for differences in the method of application of the materials or by providing extra thickness of walls, air spaces, etc.

In this connection the writer has often had to call attention to the original design which too frequently called for vent or other ducts to pass through rooms used for noisy activities or which passed within sound transmitting curtain walls. If found existent, such cases may usually be treated as previously commented upon for other surfaces. But one case, where a large vent duct opened into a music room, transmitting the sounds to other spaces, was partially cured by providing three V transmission grills, in tandem, in the opening. This resulted in some reduction of vented air, it is true, but the transmission factor was definitely reduced.

One feature of this problem often neglected is the influence of the presence of people upon sound absorption. When we find that the absorption coefficient of a common plastered wall is around 0.03, per square foot while that of a person is of the order of 4.5 to 4.7, we can see what a difference the presence of people in a room makes so far as acoustics is concerned. Even half an audience makes a whale of a difference in a room corrected for a full audience, and vice versa.

The Gymnasium Noise

The more spectacular acoustical deficiencies are of course to be found in gymnasiums and auditoriums, but especially in the combination areas. Exuberant youth in its competitive games always give vent to part of its energy in yells, howls, shrieks, whistles, Bronx cheers, and other noises which defy description. In isolated gymnasiums there may not be much need of reducing the noise level artificially; but in case the gymnasium is an intimate part of the school itself it may require drastic acoustical treatment. As a rule, and by selecting the proper materials, ceiling treatment may be quite effective. Of course vaulted or arched ceiling constructions introduce their own problems, but they should be easy to solve at the hands of a competent designer. If the gymnasium is used for a dual purpose then the problem is important.

The school auditorium, with its stage, curtains, high ceiling, often beamed, its balcony and use for oratory, dramatics, and other quasi-public activities has its own pestiferous problems. If properly corrected for a speaking voice and a half audience, it will probably be a fizzle for band music and a full audience (no slur intended) though it will probably be fine for an orchestra or a two-thirds audience. Dramatic performances will introduce the open stage with its scenery and trappings; and then we have the last rows of the balcony and row Z on the main floor to deal with. I suspect there is no perfect auditorium, but one can see what a task it is to design an auditorium which is acoustically very good. Even the talkies have introduced serious acoustical problems into existing theaters and auditoriums; they had to be corrected or special sound equipment used.

Of course the designer who specializes in such work does not do haphazard work, at least, we hope he doesn't, and there is much he can do to make spaces acoustically good in the beginning. Sound waves follow the same laws as do other waves; the paths of reflected waves may be mathematically determined, and the shape, disposition, and characteristics of the limiting surfaces may be known. Yet it is not a simple job to design spaces for good acoustical effects. If defects are found then the previously discussed principles can help out and proper corrections made. The schoolman need not be helpless.

A Bad Situation Corrected

In closing, let the writer describe a practical situation of acoustical defects, the method used to analyze it, and corrections applied.

The room in question was a small auditorium 50 by 80 ft., with a 21-ft. flat ceiling; it had windows on one side and a stage with a proscenium 36 by 16 ft. The seats were upholstered and fixed. The acoustics were poor and a lot of "booming" was in evidence, even with a full audience. So the room was checked as to its total sound absorption in the following manner. The area of the plastered ceiling and walls was 8250 sq. ft.; that of the floor, 4000 sq. ft. As the coefficient of absorption was about the same for these surfaces, 0.03, we found the total absorption to be 381 units. To this we added the stage opening effect of 144 units and that of the seats, 1000, a grand total of 1525 units. But a full audience was expected most of the time.

(Concluded on page 93)

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The American
School Board Journal
William C. Bruce, *Editor*

SCHOOL CONSTRUCTION IN 1952

THE public schools of the United States are undergoing a serious setback in schoolhouse construction similar to the setbacks which they suffered during the war periods from 1917 to 1919 and from 1941 to 1945. The limitations on materials, the shortage of man power, the inclination of contractors to ask unreasonable construction prices, and the indifference and antagonism of the defense bureaus in Washington will make the year 1952 extremely difficult for maintaining reasonable construction programs for needed school buildings.

During the calendar year 1952 there will be a need for at least 94,000 new classrooms to replace obsolete and worn-out rooms and to provide added classrooms for increased school enrollments. This need will hardly be met in spite of the fact that conservative estimates indicate that not less than 5400 new school buildings of varying sizes will be erected, at a total cost of $1,104,700,000. The end of the year is certain to find the present shortages becoming more pressing unless the Korean war ends suddenly and the government puts some brakes on the preparations for possible hostilities in other areas threatened by Russian pressures.

The only encouraging news from Washington indicates that the inventory phase of the national survey of school plant facilities, under the auspices of the U. S. Office of Education, came to a close in December, 1951, and the planning phase of the study should be underway by July, 1952. It will require nearly six months to tabulate and evaluate the findings submitted by the states, so that the state school offices can move forward. It is probable that the summer of 1953 will be reached before the states have definite data upon which to base their programs of state and local financing and of issuing to the counties and local districts recommendations or even directives for locating and erecting new plants. There is great hope that the national survey will raise the standards of school plants to a new level of educational efficiency.

The great baby crop of 1946 which is reaching the schools in 1952 will further extend the enrollment bulge that is moving now into the middle grades and is continuing to cause a demand for more elementary buildings. All this means that the interest in planning schoolhouses will continue to be limited largely to elementary schools. Ultimately, by 1954 or 1955, high school enrollments will skyrocket. For the next year the withdrawals of prospective army inductees and dropouts due to defense labor needs will continue to halt increases in high school enrollments.

The tendency to limit the elementary school to 350 or at most to 450 children is gaining in acceptance, and will be the pattern for schoolhouse planning in the next year or two. Buildings are more commonly than ever one-story high, with facilities for large group activities. According to the financial ability of the school districts these general facilities range from a simple all-purpose room with a kitchen and a stage as adjuncts to the more elaborate arrangements with separate rooms for assemblies and indoor play, cafeteria and kitchen, and a small library or bookroom. Under present conditions it has been found hard to defend economically the single loaded corridor; it may be expected that the tendency toward the double loaded corridor, which has administrative as well as cost advantages, will return as standard practice.

In planning elementary classrooms, the ultimate in novel arrangements of lighting, ceiling slants, and work alcoves seems to have been reached. We still need experimentations but more attention should be given to the advantages and failures of the unique types of rooms erected in recent years. The novelty of the square rooms has worn off in the past two to five years, so that the sound experience of teachers and administrators should be gathered and used effectively in further designs for informal layouts.

The architect engaged in schoolwork will find his greatest problem in 1952 in changing his notions of good construction so as to provide permanence and economy without the use of large amounts of steel, aluminum, and copper. After all of the pressure brought during the past three months on the NPA, the additional 15,000 tons of steel allotted for the first quarter of 1952 is pitifully small when compared with the proved needs. Even though there may be a change in the international situation, which cannot now be foreseen, it is not likely that NPA will give more than lip service to the schools. It is clear that concrete or wood construction must be substituted for steel. Whatever is done, it will be of lasting harm if the redesigned plans of schoolhouses will be a return to old, conventional types of plan and construction. There is more than ever a need for individual solution of each school plant problem; there must be more than ever flexibility in rooms through the use of movable partitions, the location of plumbing, and heating facilities, wiring, etc.

For the school boards and their executives, the new year is an opportunity to plan and administer their school plant programs with vigor and shrewd adaptation to general conditions and local situations.

PRAYER IN SCHOOL

BY UNANIMOUS vote of its 13 members, the New York State Board of Regents has approved the following prayer for use in the public schools of the state: "Almighty God, we acknowledge our dependence upon Thee, and we beg Thy blessings upon us, our parents, our teachers, and our country."

The board added this comment to the suggestion that the prayer be recited each morning: "We are convinced that this fundamental belief and dependence of the American, always a religious people, is the best security against the dangers of these difficult days."

RESPECT FOR EDUCATORS

DR. LOY NORRIX, in his Weekly Bulletin of the Kalamazoo public schools, recently touched upon the public respect paid to teachers:

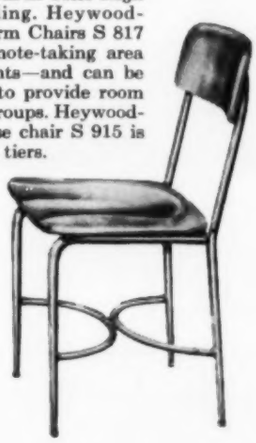
> A few weeks ago a prominent speaker, addressing a Kalamazoo audience, pointed out what he considered to be definite weaknesses in our life of today. One — that we are losing respect for authority. Two — we are losing the zest for hard work. The speaker made a good case and most of the audience was impressed. Particular mention was made of loss of respect for the school teachers, and then on the loss of respect for law and officials in government.
>
> Reflecting upon these statements, one can argue on either side. Regardless of the attitude we may take, all of us know that there is too much disrespect for teachers, law, and government in general. Teachers do not, as was true one hundred years ago, represent "all" knowledge. We have books, libraries, laboratories, museums, the press and the radio from which we secure knowledge today as well as from school masters. We do not hold in "awe" the schoolmaster as described by Goldsmith "and still they gazed, and still the wonder grew, that one small head could carry all he knew."
>
> The teachers of today and the policeman of today have much greater respect, in my judgment, from the great majority of the people than was true one hundred years ago. There is evidence, however, that we are still failing to achieve respect in all too many cases.

Teachers and school administrators have a real responsibility for awakening and maintaining among the people a respect for themselves as educators. Such respect as exists is the direct outcome, not so much of their personalities and public relations, but of the effectiveness of their educational philosophies, of the total culture and morals which the public schools create.

NEW TRIER HIGH SCHOOL BUILDING
will be "MODERN" a long, long time

Like so many contemporary structures, this new Winnetka, Ill. music building will be "modern," and well suited to the community's needs a long, long time. Because it uses light and stone and steel and other elements so effectively to make a pleasant, efficient place to learn. Because it is equipped throughout with sensible furniture that can be re-grouped at will to meet the changing needs of each class. The building was designed by Armstrong Furst and Tilton, Architects, Chicago, Ill., and the installation of Heywood-Wakefield light weight tubular steel furniture for all classrooms, was arranged through the Potomac Engineering Corp., Chicago, distributor for Heywood-Wakefield Company, 666 Lake Shore Drive, Chicago 11, Ill.

Graphic example of how sensible furniture helps adapt a given space to many uses is this room in Trier High School music building. Heywood-Wakefield Tablet Arm Chairs S 817 TA provide ample note-taking area for advanced students—and can be easily moved aside to provide room for dance or choral groups. Heywood-Wakefield all-purpose chair S 915 is used for the circular tiers.



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SELMA ARTICULATION PROGRAM

The Selma Union High School, Selma, Calif., under the direction of Principal L. O. Blayney, has established a new interdistrict articulation program including six elementary districts. To each of the schools, four tickets to sports are sent each Friday night. The schools choose their two to four student recipients from a list of the best citizens of the town for the week.

The plan is intended to serve the rural elementary schools and to help boys and girls become better acquainted with the high school.

EFFICIENCY OF HIGH SCHOOL GRADUATES

At Sebring, Ohio, a study has been made, under the direction of Supt. Leon S. Force, to determine the efficiency, as well as the educational, physical, and social traits of McKinley high school graduates. The inquiry made during the school year 1950–51, sought information to place the year's graduates in the best positions suited to them. The occupational information obtained has helped the school faculty in directing and teaching the students as to what would be expected of them in local business offices.

The study revealed that 50 per cent or more of the students were above average in the four important efficiency traits which were ambition, dependability, industriousness, and responsibility. A large percentage of the students employed were average in the educational traits of spelling, speech, broad education, and business education. About 62 per cent were above average in cooperation and trustworthiness, and over 57 per cent were average in loyalty and poise.

COLLEGE ENROLLMENTS

The annual survey of college and university enrollments by the U. S. Office of Education indicates that the total enrollment as of October, 1951, was 2,116,000, a reduction of about 140,000 from the 1950 enrollments. The freshman class of the present year dropped 9 per cent below last year. The immediate influence on enrollments seems to be the draft and the expiration of the G.I. law.

THE SUPERINTENDENT'S CABINET

At Searcy, Ark., an advisory group named the superintendent's cabinet, was organized in September, 1949, for the purpose of giving counsel in school policies and problems.

This cabinet consists of the superintendent, the parent-teacher association officers, and all of the school principals. Meetings of the cabinet are open to other interested persons and frequently others are invited to particular meetings where matters of concern to them are to be discussed. The cabinet meets once a month and on the special call of the superintendent.

The cabinet is purely an advisory body, since authority in all school matters rests with the board of education. The board, however, relies considerably on faculty planning, as other boards do.

AUDIO-VISUAL EDUCATION

At Fitzgerald, Ga., the school board has increased the effective use of audio-visual education materials in all schools. Each building has been equipped with film-strip machines, record players, and sound projectors. The board is now in the second year of a four-year program providing an adequate library of films, film strips, and recordings, in a central location, for the use of all schools.

The school faculty has begun a continuous study of problems of the schools. The faculty is divided into four groups, each group studying the problem of its choice. Some helpful results have been revealed as a result of the study.

SPECIAL CLASSES FOR SLOW LEARNERS

In an effort to meet the special needs of a number of high school students who are physically, chronologically, and socially mature, but deficient in reading skills and too slow in learning, the board of education at Kansas City, Mo., has established a number of special classes in six secondary schools.

At present there are 15 of these special groups, with most of them enrolling fewer than 20 pupils each, utilizing the time of 11 teachers, and extending from the seventh to the tenth grades.

One of the chief difficulties of these youth is reading disability, which has been found in some cases to be so serious that the pupils are practically nonreaders. The problem has been to find reading material with mature interest level but of low reading difficulty.

A plan for providing a graded sequence of instructional material has been prepared by a committee of teachers and used successfully for providing common learnings.

HE VISITS SCHOOLS

"Eager beaver" is the title bestowed on Leo Weinrott by his 14 fellow members of the Philadelphia, Pa., board of public education. Mr. Weinrott has been on the board for less than a year. All board members serve gratis as trustees of an organization which spends nearly $60,000,000 annually.

Since his appointment last December 7, Weinrott, 56, an attorney, has made unannounced visits to each of the city's 229 public elementary, junior and senior high and vocational schools. He has also attended evening and afternoon PTA meetings, spoken at many assemblies and talked to every special class for retarded or handicapped children.

Summing up his findings, Mr. Weinrott said: "It is one of the best school systems in the country. Its special services for those with physical or mental handicaps are amazing."

PUBLISH MANUAL OF RULES

During the summer of 1951, the West Allegheny Joint Schools, at Imperial, Pa., completed the compilation and publication of a 40-page Manual of Rules and Regulations. These rules are the result of a complete study of the school policy by a committee of the school board, including members of the board, the administrators, and members of the teaching staff. The booklet does not cover all phases of school organization and activities, but it does attempt to bring into useful form, some of the policies under which the schools are operated and by which they may be improved. It covers such important items as organization and procedure of the board, duties of personnel, transportation of pupils, use of school buildings, retirement of school personnel, organization of the schools, an area map, and a school directory and articles of agreement.

A SCHOOL BOARD VISITING DAY

For many years the elementary school board at Elmhurst, Ill., has kept abreast of curriculum changes and teaching techniques by inviting teachers, supervisors, and principals to discuss their work at regular or special board meetings. Since this method was time-consuming and the full cycle of the program was interrupted by an occasional change of personnel, it has been decided to have a school board visiting day in a reverse form.

On the scheduled day, the seven members gather at 8:30 a.m., in the superintendent's office where they are met by the building principals and given a copy of the day's program. Divided into three groups, the board members see classes at each grade level and in all the different subjects. Each one of the 108 classrooms is visited by at least one of the groups during the school year. At the close of the day, the board members attend the regular monthly meeting of the Teachers' Council at which a pertinent topic is presented by a competent speaker.

Both board members and teachers are enthusiastic and even the parents and the press were impressed by the fact that seven busy men took time off to "Go to School." The board members were of the opinion that "seeing the children in action" was much more meaningful than hearing about them. The visit is now an annual affair which does much to raise the morale of the teachers, to inspire the members of the board, and to improve the final relationship existing between the two.

SCHOOL BOARDS

► Texarkana, Tex. The school board has appointed a committee to investigate the school cafeterias, particularly in regard to their finances. A recent report showed that the cafeterias had lost more than $900 during September. For the same period last year the cafeterias showed a surplus of $300.

► Leavenworth, Kans. A board of education advisory council, with a membership of 40, has been proposed by the school board. The Council is to meet every other month and seek to acquaint the citizens and patrons with the work and problems of the schools.

► School Dist. No. 120, Galena, Ill., in September, 1951, voted to come under the common school laws of the state. The action repeals the special charter in force since 1858. On October 27, a board of education was elected, composed of seven men.

► The school boards of elementary schools in New Trier Township met at the high school in Wilmette, Ill., for an informal discussion of common problems of the schools. From this beginning it is expected that board committees will be organized to study problems on the township basis.

Word From Washington

Increasing Our Scanty Supply of Scientists and Engineers

Elaine Exton

In the present emergency assuring an adequate supply of trained engineers and scientists "is just as important to the national safety as the stockpile of critical materials" in the opinion of Karl T. Compton, chairman of the Corporation of the Massachusetts Institute of Technology, who points out that "just as we do not have enough steel, or cobalt, or rubber, or manganese to build everything we would like to build, so we do not have enough scientists to handle the jobs that are on our program" to meet defense requirements and supply the needs of our civilian economy as well.

Reminding that "there is a limit to the extent to which our small supply of skilled workers can be stretched to meet current needs," Defense Mobilization Director Charles E. Wilson comments: "We need such skills right now but our needs will grow as the present defense program reaches its peak, as our new capacity permits an expansion of our economy and as our whole economic, social, and military structure becomes more complex."

Demand for Engineers and Scientists

The mobilization program, for instance, has created a great, added need for engineering personnel in defense industries, in those converting to defense production and in the development of new defense-related products. While the number of new engineers that will be required yearly cannot be precisely foretold on the basis of information now available, the Department of Labor's Bureau of Statistics estimates roughly that "the average annual demand during a prolonged partial mobilization would probably be at least 30,000."

This figure takes into account replacements for those who die or retire and would provide about 21,000 engineers annually to fill new jobs and occupy positions vacated by persons leaving the profession for other lines of work. The nation's scientists and engineers now number around 570,000. Of these, the largest group — about 400,000 — are engineers.

A preliminary evaluation of the Committee on Specialized Personnel of the Office of Defense Mobilization calculates that in 1954, the nation will be faced with a serious shortage of approximately 130,000 scientists, engineers, technologists, and physicians. The Health Resources Advisory Committee of this agency concludes that "if we maintain the 1949 level of physician care and still meet military, civil defense, and other mobilization needs, the expected 1954 supply of physicians falls short by an estimated 22,000 and shortages of 9000 dentists and 49,000 nurses are anticipated by that date."

Students Needed in Fields

The lowest practicable number of first-year college men that will be needed annually to maintain the flow of new graduates into engineering, science, and health professions that our defense economy requires over a period of years is placed at 110,000 by experts in the Department of Labor's Division of Manpower and Employment Statistics.

This rough estimate encompasses 22,500 to 46,000 male freshmen training for health professions, 40,000 to 60,000 preparing for engineering, 30,000 to 45,000 studying for degrees in natural sciences. Due to the many factors involved the number needed in each of these fields cannot be stated exactly.

Decline in College Enrollments

Fewer students are enrolled in U. S. colleges and universities this fall than last year according to a recent survey of the Office of Education, which shows a total registration of 2,116,000 students in higher education in the fall of 1951 as compared with an over-all registration of 2,296,592 in 1950, a drop of 7.8 per cent.

Most of this decrease is due to a decline of nearly 11 per cent in men students below the 1950 registration, the loss in number of women enrolled being 1.3 per cent. Veteran students, of whom well over 95 per cent were men, decreased about 32 per cent in this same period. The low birth rate in the early thirties and developments growing out of the Korean crisis are among the factors influencing these declines.

From 1950 to 1951 the number of bachelor's degrees awarded dropped 11 per cent. If the enrollment decreases continue for the next few years, by 1955 the number conferred might fall to 55 per cent of the all-time peak of more than 430,000 in 1950. It is thought the drop will be sharpest in specialties such an engineering and the sciences which are predominantly men's fields.

By way of illustration, Henry H. Armsby, the U. S. Office of Education's Associate Chief for Engineering Education, reports that unless conditions change sharply the number of engineering graduates — which stood at 52,071 in 1950 — will fall to about 17,000 in 1954, and possibly even lower if withdrawals of college-age men for military service are included. If normal attrition rates prevail the total number of engineering graduates will not reach the estimated need of 30,000 per year until about 1965 in his opinion.

National Conferences Consider Problem

The immediate and long-range shortage of engineers and scientists and means for meeting it were the focus of attention at two recent educational gatherings: The Institute for Science Teachers sponsored by the Thomas A. Edison Foundation in West Orange, N. J., November 12–13, 1951, and a conference held in the nation's capital three days later under U. S. Office of Education auspices.

It was the consensus of both meetings that schools have a primary responsibility for helping with the early identification and training of future scientists and engineers. As Bernard B. Watson, Office of Education Specialist for Physics, put it "the only hope of increasing the output of our colleges in these fields after 1954 lies in creating an increased interest in preparing for these professions among properly qualified boys and girls, and in finding ways of making it possible for them to satisfy this interest by continuing their education beyond high school levels."

Guidance to Conserve Talent

Emphasizing that the over-all shortage of trained personnel in America is by no means confined to science and engineering, Campbell B. Beard, executive secretary of the National Vocational Guidance Association, advocates the expansion of school guidance services to facilitate early discovery of the interests and abilities of students and assist those who show promise to secure suitable college training and work that will fully use their competence. In this way he believes it will be possible to raise the number of engineers and scientists without depleting the future supply of persons in other college trained specialties.

Among the other guidance activities suggested to ease the problem were presenting to both girls and boys accurate, current, and vivid occupational information that takes into account long-range trends as well as immediate needs; furnishing students with descriptive reports of types of professional work that engineers, scientists, and technologists do; calling attention to the contribu-

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tions that women can make in science and engineering.

Encouraging Scientific Interests

There was general agreement that pupils in elementary grades as well as in junior and senior high school should be encouraged to practice and experience science and engineering in a wide variety of types and levels of activities. Suggestions of conference participants ranged from using retired scientists in hobby clubs to providing organized courses in aviation mechanics that include four hours of flight experience in all vocational schools.

Other ideas offered to incorporate science-related projects in the school program include:

1. Organizing and maintaining science, engineering, mathematics, and other related forms of clubs.
2. Aiding the planning and presentation of science fairs, science assemblies, and science congresses.
3. Providing special opportunities for talented students to compete for state and national honors, including utilization of the annual Science Talent Search co-sponsored by Science Service and the Westinghouse Educational Foundation.
4. Making greater use of scientists and engineers in precollege studies of occupations, for career nights, "Business-Industry-Education" Days, and interviews.
5. Extending the schoolwork program to include part-time employment in industrial and scientific laboratories.
6. Stressing the opportunities for and values of manual skills in relation to school, home, and community activities.

These meetings also yielded a number of proposals for preparing teachers to foster interest in science and engineering and give them firsthand experiences in these fields. Among those receiving prominent mention were expanding the program of teachers' visits to industries so they can obtain basic information on what scientific and engineering jobs require; providing opportunities for study and/or summer employment of science and mathematics teachers in work related to science and engineering; furnishing awards or leave stipends to outstanding science teachers to enable them to continue their studies or attend out-of-town professional meetings with other teachers and educators.

Enlarging Scholarships

Close scrutiny was also given to the need for establishing and maintaining additional scholarships at national, state, and local levels to make it possible for youth to pursue science-related interests who might find it necessary to cut short their education without such aid. It was pointed out that many promising students drop out of high school to accept employment because they feel obligated to contribute to their family's support.

Dael Wolfle, director of the Commission on Human Resources and Advanced Training, reported that at the present time only about half of the high school graduates who are potentially good college material go on to college. He noted further that this attrition among bright students continues in college as half of those who enter fail to graduate. "There are two main reasons why bright students fail to go to college or quit before graduation if they do go," he explained, "lack of interest and lack of money."

Dr. Philip G. Johnson, Specialist for Science in the U. S. Office of Education, viewed lack of student interest as largely due to the narrow types of activities assigned by science teachers and stressed that an enthusiastic teacher with knowledge of the work that scientists and engineers do can make school science courses and further training in science seem important and attractive to youth. He suggested that school officials might approach local organizations about creating scholarships to aid in keeping in high school pupils who demonstrate ability in science and mathematics.

Educators and others who recognize the need for additional opportunities for gifted students to continue their training beyond high school may wish to make known to the National Science Foundation (2144 California Street, N.W., Washington 25, D. C.—Dr. Harry G. Kelly, assistant director) their interest in having the Foundation's graduate fellowship program extended to provide scholarships in scientific fields at the undergraduate level, especially for college freshmen.

Since to date its available scholarship funds have all been allocated to graduate fellowships it is not generally realized that the National Science Foundation Act of 1950 permits the Foundation to award undergraduate scholarships in the sciences.

Ventilation of School Classrooms

(Continued from page 41)

has been made to show how the fundamental objective of winter-weather ventilation can theoretically be achieved, provided this objective is kept clearly in mind, in all of the various ways which have been attempted. In terms of the principles expounded, *any* method of classroom ventilation may be evaluated as to the theoretical possibility of its providing control of classroom overheating; unless the system under consideration provides one or another means for mixing indoor and outdoor air along the lines indicated it cannot do the required job. If it provides such means, the question is then: Are the means provided *adequate* to solve the problem as it exists?

Adequate Ventilation for Comfort

In the present state of the ventilating art, standards of adequacy for winter ventilation for cooling purposes are virtually nonexistent. The practice is virtually universal of circulating air through the classroom at a rate of about 30 cfm. per pupil at all times when the ventilating equipment is in operation, with some minimum admixture of outdoor air, usually one half to one third of the total quantity circulated, admitted during periods when the heat demand is positive. During periods when cooling is required, obviously the maximum quantity of outdoor air which can be admitted, under this arrangement, is 30 cfm. per pupil, or about 900 to 1000 cfm. for the average classroom. This figure is exceeded, in most designs, only when a greater capacity is indicated as necessary for *heating* purposes, and not always then, since the additional heat may be provided by supplementary means. Little consideration has been given, in the past, to whether it is adequate for cooling purposes, and to the fact that the question of what *is* adequate varies with the climate and the school building.

This is a technical question, and as such not the concern of school officials. However, a word of caution may be of value. Data from unit-ventilator-equipped classrooms, in which the entire capacity of the ventilating system is available, under appropriate circumstances, in the form of untempered outdoor air (which may not be true of other systems of mechanical ventilation), have shown that 1000 cfm. of outdoor air is frequently barely sufficient, and sometimes insufficient to provide overheating due to solar heat gain. This is true of classrooms of the modern type, with their increased glass areas — although it should be noted that some modern designs, in which sun shields are provided for the windows, succeed in reducing this problem by excluding sun heat. It is one of the little appreciated advantages of the so-called blast system of classroom heating, in which the entire heating capacity is concentrated in the ventilating equipment, that such systems often provide added capacity for cooling, when needed, besides being more economical to install than split systems. In classrooms employing large areas of fixed glass, and comparatively small operable windows, such excess capacity may be a matter of necessity.

Warm Weather Cooling

In the discussion above, only conditions prevailing during the heating season have been taken into account. When the outdoor temperature goes above about 60 degrees, the winter-weather ventilating system throws up its hands, figuratively, and denies further responsibility for what happens. To be accurate, the teacher throws open the windows. Nevertheless, adequate ventilation for comfort also encompasses the question of the warm-weather performance of the ventilating system, or at any rate, should encompass it. This question has two aspects: (1) provision of sufficient outdoor air to prevent the *classroom* from overheating, or becoming significantly warmer than the out-of-doors due to solar and bodily heat gains, and (2) provision of a positive air movement within the occupied area of the room to prevent *pupils* from overheating, or becoming significantly warmer than would be the case if they enjoyed the cooling effect of outdoor breezes.

Warm-weather ventilation of the first type is similar to ventilation-for-cooling in winter weather, that of the second type very different. Thus in the first instance the object is to get rid of unwanted heat with as little direct effect on the pupils as possible, while in the second instance it is the direct effect on the pupils that is wanted.

An example of the first kind of problem might be a classroom having a large, unshielded glass area facing west in a comparatively warm climate. If such a classroom was constructed (as frequently happens when the upper part of the window consists of glass block) with no exit for air from the upper part of the room, it might, on occasion, become considerably warmer than the out-of-doors. Such a problem is partly a matter of classroom orientation, partly a matter of sun shielding and window design, and partly a matter of ventilation (it is definitely *not, per se,* a sufficient reason for eschewing glass-block fenestration — although in some areas it has been mistakenly so considered). To the extent that it is a problem in ventilation, it is a comparatively simple one: The solution is to provide a means of exit for air in the upper part of the room with sufficient capacity to carry off the entering solar heat. Such a means might be a gravity ventilator in the roof, openings in the upper part of the glass-block panel, or an exhaust fan; in any case it would have to be fairly large, since the quantity of heat entering through windows of any type under such conditions is considerable.

An example of the second type might be any classroom, with or without an exceptional heat gain, in a hot climate where school is likely to be in session in really hot weather. Here, air movement is needed across the occupied part of the room on the order of 75 to 100 feet per minute, or more if possible — a rate of air movement which, under winter heating conditions, or conditions of mild weather room cooling, would be highly objectionable. One way such a rate of air movement can be achieved, under favorable conditions, is by "cross ventilation" — by the location of suitably designed openings, of suitable size, on opposite sides of the classroom, together with adequate consideration for the prevailing direction of cooling breezes during hot weather and other such factors in the over-all planning of the school building.

This type of "natural ventilation" has recently received a great deal of very expert attention from architectural researchers at Texas A. & M. College, the results of which have been reported in the architectural press and are beginning to influence the work of school architects.

As an alternative to such expert architectural design, another solution of a persistent hot-weather cooling problem might be the use of large-capacity exhaust fans similar to the "attic fans" popular in such areas, arranged to draw air out of the upper part of the classroom and thus in through the windows. With big enough fans, and the windows opened to just the right extent, this would produce considerable air movement across the room. Ordinary mechanical ventilation for winter conditions does not have suffi-

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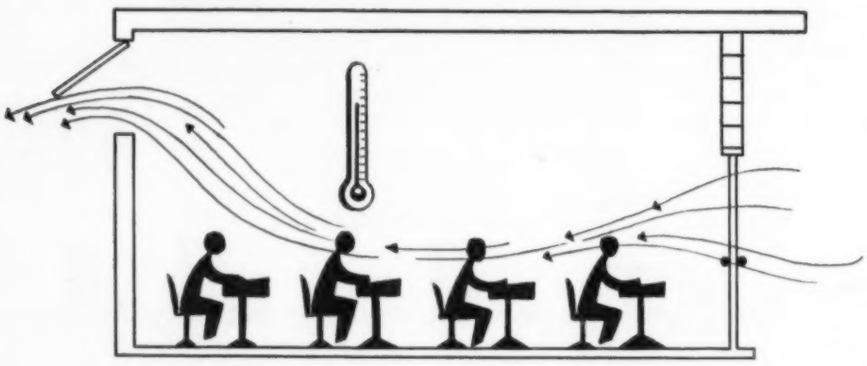

Cross ventilation is needed on warm days.

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cient capacity for this purpose, nor is it installed in such a way as to direct the air toward the pupils — since this would be highly inappropriate for its wintertime function. There is no reason, however, why mechanical ventilation of a special type should not be installed for this purpose where hot-weather comfort is sufficiently important to warrant such a step.

Ventilation Control

It cannot be said too strongly that school ventilation should be controlled on a classroom by classroom basis, regardless of type. Thermal conditions in particular classrooms, even on the same side of the building and subject to the same sun and wind conditions, vary in accordance with the number of pupils in the room, whether the lighting system is on or off, whether or not the particular room is the terminal unit of a series, over a heat space, and so on — and *should* vary, as well, according to the type of class activity. Thermal conditions influencing classrooms on opposite sides of the building will, of course, vary enormously with the direction of the wind and sun. Since ventilation plays a vital part in classroom temperature control, and especially in the control of overheating due to solar heat gain, the quantity of outdoor air entering each classroom must be constantly adjusted, in winter, according to the thermal conditions obtaining in the particular room. It is not sufficient that the heat supply be so controlled; this is necessary, but not enough. Winter comfort-conditioning of the schoolroom is primarily a *cooling* problem, and control of the "cooling system" — the admission of outdoor air — must be in terms of each individual room. One way of doing this — a poor one — is to leave it up to the teacher, and the opening and closing of windows. The other way is through thermostatically controlled ventilation, with a separate thermostat, dampers, etc., for each room. This is the only way in which the thermal conditions most conducive to constructive classroom activity can be assured at all times.

PERSONAL NEWS OF SCHOOL BOARD OFFICIALS

► Daniel W. Eschenbrenner has been appointed a member of the board of education at Brentwood, Mo., to fill the unexpired term of A. B. Padon, who has resigned.

► The school board at Des Arc, Ark., has elected Norman C. Roe as president, and J. E. Berry as secretary.

► Ben F. Garrison has been elected president of the board at Harrison, Ark. Dr. H. V. Kirby was named secretary.

► G. A. Jimerson has been elected president of the board at Corning, Ark.

► The school board at Walnut Ridge, Ark., has reorganized with G. E. Henry as president, and G. H. Ring as secretary.

► The first woman school director in the history of Altoona, Pa., takes her position on the board with the start of 1952. Mrs. Marjorie G. March won the highest vote in the city's race with a whopping 14,155. The present president of the board, Paul R. Reynolds, was re-elected with the second highest vote — 11,797.

► Dr. Paul M. Bancroft is the new member of the board at Lincoln, Neb. He succeeds the late Dr. Stanley G. Zemer.

SCHOOL FINANCE AND TAXATION

PHILADELPHIA SCHOOL TAXES

The board of public education of Philadelphia, Pa., has announced a 4 per cent increase in the real estate tax for school purposes. It amounts to a five-cent increase, or from $1.27½ to $1.32½ for each $100 of assessed property valuation. It is estimated to produce at least $1,400,000 more revenue.

The tentative 1952 school budget reflects this increase, while continuing a four-mill tax on personal property and a one-mill general business tax. The budget totals $58,970,000, which is $1,000,000 more than this year's school expenditures.

For the first time in years it is more than just a "balanced" budget. After allowing for nominal cost increases in all its major items, there remains $1,255,000 that is at least tentatively "available for appropriation." Since the Philadelphia salary scale has fallen behind that of many other cities, it is probable that this unappropriated sum may be used to lift the salary schedule.

School authorities hinted they favored a general salary increase for all the district's 11,000 employees, but withheld specific comment. They said this was partly because of two problematical factors: (1) How much greater the city's real estate valuation would be next year. (2) General Assembly action next month on teacher salary benefits.

The one-half mill tax boost on real estate — from 12¾ to 13¼ mills — was authorized by the Legislature several months ago, after it had been proposed by the Greater Philadelphia Movement to permit the school district to catch up with rising costs.

The 1951 school district budget was much "tighter" than the budget for the coming year. It had to allot $1,543,000 to pay deficits from 1948 and 1949, and also a $200 salary boost for teachers and secretaries and $100 to $150 for other employees. Compared to this year, however, $1,000,000 more had to be inserted in the 1952 budget to meet the pledge of the $200 annual increments for teachers not yet at the $4,000 to $4,800 salary ceilings.

No one has been backward in coming forward for increases and three teacher organizations have announced their suggestions. They follow: (1) *The Philadelphia Teachers' Association.* (This is NEA's local affiliate and largest of the groups.) Annual increments of $300 instead of $200 with a double increment of $600 next year so teachers can more quickly catch up with living costs. (2) *The Federation of Teachers* (AFL). A $600 rise, retroactive to cover 1951, plus $300 additional for 1952. (3) *The Teachers' Union* (CIO). A $600 rise for all teachers, and all present ceilings raised by this amount.

The caboose on this train of thought was the request of the Philadelphia Public School Employees' Association for "substantial increases" for workers in the custodial, maintenance, cafeteria and transportation department.

At Titusville, Fla., the Brevard county board of instruction has asked the Florida Supreme Court for a ruling on the legality of bond issues called for in special tax school districts. A favorable decision of the court means that a bond election will be called to vote bonds for a junior-senior high school, one elementary school, and a Negro high school. The county board has prepared plans for a building program to cost $215,000 and to be financed with capital outlay funds.

SCHOOL BONDS SOLD

Amarillo, Tex. Bonds, $850,000, sold, at interest rate of 2.08846 per cent.

Kansas City, Kans. Bonds, $200,000, sold, at interest rate of 2.1116 per cent.

McDonough, Ill. Bonds, $750,000, sold, at interest cost of 2.1745 per cent.

Central School Dist. No. 1 of Hyde Park, N. Y., Poughkeepsie, Clinton, and Pleasant Valley, has sold $990,000 in bonds, on a bid of 100.14 for 2s. The bonds are scaled to yield 1.10 to 2.10 per cent.

Waco, Tex. Bonds, $1,900,000 sold at 1.94615 per cent.

San Antonio, Tex. Sold, $2,000,000, at 2.81 per cent interest cost.

Hillsdale, Mich. Camden Rural Agricultural School District sold, $455,000, at 2.357 per cent interest cost.

Hennepin County, Minn., School District No. 17. Sold, $250,000, at 100.130; coupon rate 1954–60, 2¼ per cent; 1961–67, 2½ per cent; 1968–78, 2.70 per cent.

Fort Pierce, Fla. The St. Lucie County board of instruction has sold a bond issue of $1,530,000 for financing the construction of needed school facilities. Plans have been completed for a senior high school, a six-room addition to the white elementary school, and a Negro school. Bids on the project will be received in February, 1952.

Boulder, Colo. On November 28 the Boulder school board sold $1,135,000 of 20-year school bonds, to a syndicate of bankers, at a net interest rate of 1.8580266. The proceeds of the bonds will be used to construct a junior high school, an addition to an elementary school, and the complete modernization of classroom lighting.

Longview, Wash. $60,000, bonds, sold, at $100 premium, and 1.973 per cent interest.

Milwaukee, Wis. Sold, $2,000,000, at 100.3395, for 1½ per cent coupon. Net interest cost, 1.14676.

New London, Ohio. Sold, $343,000, at 101 194, 2½ per cent coupon.

SCHOOL BONDS APPROVED

Shreveport, La. $20,000, bonds, approved.

Forest City, Iowa. Bonds, $215,000, approved.

Western Springs, Ill. In October, 1951, a bond issue of $300,000 was approved. The proceeds of the bonds will be used to construct the Forest Hills School, a one-story building with a gymnasium-playroom, eight classrooms, etc.

Boulder, Colo. Bonds, $1,135,000, approved.

McPherson, Kans. $600,000, bonds, approved.

Prairie School Dist., Johnson County, Mo. Approved, $600,000.

Ogallala, Neb. $98,500 passed.

Neosho, Mo. $220,000 voted.

Waseca, Minn. Bonds, $390,000, approved.

Mounds View, Minn. Bonds, $2,500,000, approved.

Overland Park, Kans. Bonds, $600,000, approved.

St. Joseph, Mo. Approved, $1,900,000, in bonds.

Sioux Falls, S. Dak. For the third time in three years, the voters of the city have supported a school-bond election with a more than 90 per cent majority. On November 6, an additional bond issue of $1,000,000 was approved for school building purposes. The proposed building program calls for two junior high schools within the next four years. The vote in favor of the issue was 90.6.

Park Ridge, Ill. School bonds, $1,325,000.

Grand Junction, Colo. Approved, $1,505,700, for 1952.

Lamar, Colo. Prowers County approved, $914,176, for 1952.

Laredo, Tex. Adopted, $1,326,697, for 1952.

Duluth, Minn. Adopted, $3,418,918, for 1952.

Grand Rapids, Mich. Approved, $6,861,164, for 1952.

Toledo, Ohio. Adopted, $10,329,685, for 1952.

Eau Claire, Wis. The board of education has adopted a budget of $947,033 for the school year 1952.

Pittsburgh, Pa. Budget, $23,565,558, for 1952.

Arvada, Colo. Jefferson County adopted budget of $2,183,188 for 1952.

SCHOOL BUILDING CONSTRUCTION

During the month of November, 1951, contracts were let, in 11 states west of the Rocky Mountains, for 40 school buildings, at a total cost of $22,344,690. During the same period 7 buildings were reported in preliminary stages, at an estimated cost of $1,185,000.

During October, 1951, Dodge reported contracts let in 37 eastern states for educational buildings at a contract price of $94,118,000.

SCHOOL BONDS

During the month of November, 1951, school bonds for $57,923,166 were sold. The average interest rate as of November 1, for 20 bonds, was 2.07 per cent.

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* **Architects**
Louis C. Kengscott
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ROCK ISLAND COMPLETES BUILDING PROGRAM

At Rock Island, Ill., Architect Rudolph Sandberg is supervising the erection of a million-and-a-quarter junior high school building, to replace a destroyed structure. The building which will be occupied in September, 1953, will have an auditorium, a large gymnasium, a cafeteria, a library, an office suite, band rooms and orchestra rooms, and nine academic rooms.

Architects Swanson & Maiwald have completed a $500,000 addition to an elementary school, which includes an auditorium-gymnasium, a cafeteria, an office, and nine additional classrooms. The building will be occupied in February, 1953.

Plans are being made, according to Supt. Earl Hanson, for an election to vote a bond issue of $200,000 and to authorize the addition of eight more elementary classrooms.

MASTER PLAN OF SITE DEVELOPMENT

At Coalinga, Calif., the board of trustees of the Coalinga Union High School District, has developed a master plan of school site development, to meet the needs of the junior high school, the senior high school, and the junior college units of the district. During a four-year period, the trustees have extended the campus site from 20 to 100 acres, have completed a football bowl with a seating capacity of 4000, have provided 20 acres of playing fields, completed a boys' locker and shower room unit, a cafeteria, a girls' shower room and locker room extension. Plans are in preparation for a new junior high school, the first unit of which is now being constructed, at a cost of $600,000. The trustees have established a long-range building program which will involve an estimated expenditure of $500,000.

BEGIN SCHOOL SURVEY

The board of education of Aiken County, S. C., faced with school plant problems associated with the construction in the county of the Savannah River "H" bomb project of the Atomic Energy Commission, has engaged the consulting firm of Engelhardt, Engelhardt and Leggett to conduct a three-year continuing survey of the school building problems. It is planned to effect an administrative reorganization of the nine school systems of the area into a county unit plan of organization.

County Supt. A. J. Rutland, in recommending the survey, pointed to the great expansion of school building facilities that will be necessary in the area during the reconstruction of the AEC project. He stressed the need for a long-term building program to meet the educational needs of the county and to plan for the wise and economical expenditure of the state funds for building purposes. A major aspect of the program will be to provide equalization of educational opportunities for the races.

BUILDING PROGRAM IN PROGRESS

At Florence, Colo., the board of education of District No. 2 has begun an extensive school building program to include (1) the remodeling and enlargement of the school cafeteria, (2) the remodeling of a garage building for a trades and industries building, (3) the remodeling and furnishing of a 3-room high school unit for homemaking classes, (4) the construction of a junior high school building, and (5) a high school gymnasium to provide a basketball court and seating accommodations for 1500 spectators.

SCHOOL BUILDING

► On October 28, the new Blackstone School at Mendota, Ill., was opened with a suitable dedicatory program. The building which cost a total of $234,696, contains 293,000 cu. ft. of space and cost 75 cents per cu. ft., and 80 cents for construction and fees. The building contains 16 rooms, a kindergarten, an all-purpose room, a book supply room, a storage room, and a principal's office. A completely equipped kitchen with serving bar opens into the all-purpose room. The architectural planning and supervision was carried out by Messrs. Scribbins & Winsauer, and the educational planning was done by M. E. Steele, superintendent of schools.

► Dolton, Ill. The voters of Dist. 148, Riverdale-Dolton have approved tax-rate increases from 75 to 90 cents for the educational fund, and from 18¾ to 25 cents for the building fund. The increases are needed to enable the board to continue its efforts to maintain the educational standards in a rapidly growing community of the suburban Chicago area.

► To provide maximum schoolhousing from the $40,000,000 school bond issue, the Washington State Board of Education on November 12, 1951, placed a ceiling of $13 per square foot for state matching funds on school building construction.

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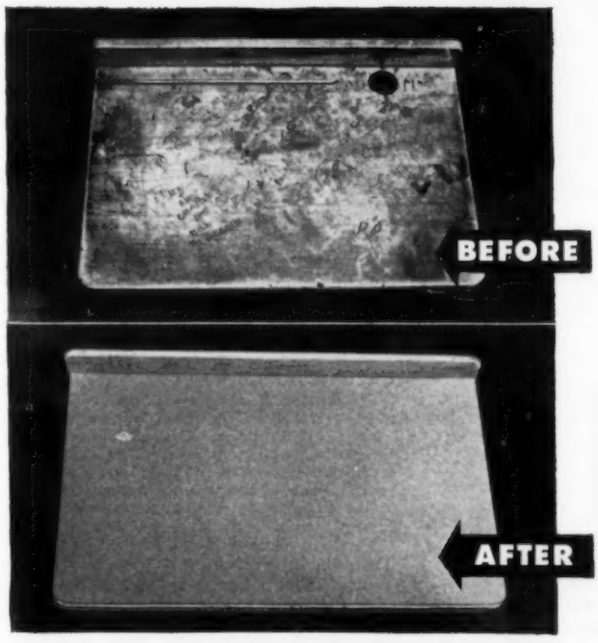

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NEW PUBLICATIONS for School-Business EXECUTIVES

A Planning Guide for the High School Library Program

By Frances Henne, Ruth Ersted, and Alice Lohrer. Paper, 140 pp., $2. American Library Association, Chicago, Ill.

This workbook addressed to teachers, provides (1) specific materials for library betterment; an outline for a complete survey of the library; (2) a method for evaluating existing services and facilities with comparative standards, accepted practices, and equipment; (3) a basis for determining needed improvements; and (4) helps for formulating a planning program that will make the library in every respect a satisfactory means of meeting the objectives of the school. The teacher who is willing to carry through this outlined work should become an efficient librarian and cannot fail in having a thoroughly valuable "tool" for successful study and reading.

School Fire Safety

By N. E. Viles. Bulletin No. 13, 1951. Paper, 58 pp., 20 cents. U. S. Office of Education, Washington 25, D. C.

The author of this helpful bulletin has had wide experience as an architect, educator, and state director of school building services. In his present office as expert of the U. S. Office of Education, he has visited numerous school buildings and has made extensive surveys of city and rural school plants. The present bulletin is in outline form and is intended to provide a complete handbook of school building construction and housekeeping for the prevention of fires.

Planning Elementary Buildings for School and Community Use

Compiled by Arthur W. Clevenger. Paper, 52 pp. Bureau of Research and Service, College of Education, University of Illinois, Champaign, Ill.

This bulletin outlines the problem and the procedures of planning elementary rural school buildings. A valuable section gives specific directions for taking the nine distinct steps in planning and administering the construction of a rural school for community use.

American School and University, 1951–52

Twenty-third Annual Edition of Yearbook. Cloth, 925 pp., $5. The American School and University, New York 16, N. Y.

This publication is becoming annually more useful and helpful. The present edition is particularly strong in reflecting tendencies in planning for better lighting and ventilation, for adjusting buildings to local community needs. The advertising section is particularly large and inclusive and correspondingly helpful.

The Mars Hill Case

Compiled by J. W. Letson, chairman of committee. Paper, 22 pp. Published by the National Education Association, Washington 6, D. C.

This report condemns political methods of appointing, retaining, and dismissing teachers in a small village in the Smoky Mountains of North Carolina.

Fundamentals of Public School Administration

By Ward G. Reeder. Cloth, xv–756 pp., $5. The Macmillan Company, New York, N. Y.

This is the third completely revised edition of a textbook which has been widely used in American colleges since 1930. The book takes up in logical sequence the principles and the present practices of administering (*a*) administrative personnel and organization, (*b*) instructional employees, (*c*) the school plant, (*d*) school business affairs, (*e*) pupil personnel, (*f*) instructional materials, and (*g*) special aspects of management. The point of view is that of defensible principles, supplemented by illustrations from actual local situations. Each chapter is supplemented by a series of questions and selected references. The whole work has a solid, matter-of-fact point of view and avoids theorizing and philosophizing. The most valuable chapters are those which are devoted to instructional methods and school business administrative problems.

Public Revenues

Compiled by Hay B. R. Smith. Paper, 77 pp. Published by the Selected Risks Indemnity Company, Branchville, N. J.

This study of public revenues, their origin, nature, and proper uses, is based on a definite concept of taxation as well as of legitimate use of public revenues. The viewpoint is that of business and industry.

A Guide to Boards of Education for a Planned Insurance Program

Paper, 24 pp. Published by the board of education of Oklahoma City, Okla.

A report of the Oklahoma City Schools idea of an adequate school insurance program.

School Salaries in 2,054 Cities

Paper, 25 pp., $5. per set. Research Division, National Education Association, 1201 Sixteenth St. N.W., Washington 6, D. C.

This bulletin lists the salaries of teachers and certain school officials in cities of 10,000 to 30,000 population, 5000 to 10,000, and 2500 to 5000 population.

Our Best Investment

Compiled by H. S. Vincent, Supt. Paper, 28 pp. Published by the board of school directors, Milwaukee, Wis.

This 1950–51 report of the Milwaukee city schools discusses the investment in education chiefly in terms of the dividends schools bring through the children they train. It contains also information concerning the budget, sources of income, enrollment, recreational and adult educational services, and special educational services.

Training by Television

Paper, 24 pp. Published by Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.

This study of learning and retention by means of television was conducted by a group of psychologists at Fordham University, N. Y. The men tested were all in the Navy. The results were satisfactory in indicating that significant gains were made on test scores which followed the use of programs.

Hot Rod

By Henry Gregor Felsen. Cloth, 188 pp., $2. E. P. Dutton Co., New York, N. Y.

The story of a boy who built a "hot rod" and, with his friends who also owned "hot rod" automobiles, raced around and endangered his own life and the lives of others on the roads. The lesson of safety is effectively presented, particularly in the final tragic chapter.

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GOOD VISUAL ENVIRONMENT

(Concluded from page 58)

in many other ways. This article has been limited to the provisions made for comfortable seeing because these are so successful and because it is felt that school authorities and designers generally will be interested in the specific data which are thus made available.

1. The installation had been made about five months before the test but the lighting had been used only about 100 hours (no class scheduled in fall term during transition from old building.) Fixtures had been cleaned recently. Total watts, 1600. Watts per sq. ft., 2.6. Average foot-candles per watt per sq. ft., 23. Test made on a very dark day — daylight would have been negligible but blinds were also tightly closed.

2. Very light overcast sky (northwest exposure). Windows slightly soiled — normal condition, not cleaned for test. Blinds lowered to permit 20-in. vision strip at bottom, slats set at about 40 deg. from horizontal, sloping down toward window, to give generally comfortable condition. All interior observations corrected to a constant daylight condition represented by the average reading of a lightmeter placed in a 45-deg. plane, toward sky, on a sill inside window. Sky brightness, observed through vision strip, maximum (1500 foot-lamberts) at 50 deg., minimum (1300 foot-lamberts) at 20 deg. horizontally from normal line of sight toward front of room. There was practically no snow on the ground.

3. Installation had been used for 6 months with an estimated 500 hours of burning. Fixtures had been cleaned several weeks before test. Total watts, 1800. Watts per sq. ft., 2.1. Average foot-candles per watt per sq. ft., 21.5. Test was made in late dusk with blinds closed.

4. Sky (southeast exposure) somewhat more overcast than for classroom test. Other conditions the same as for (2). Sky through vision strip almost uniformly bright at about 100 foot-lamberts.

Even with reasonably constant daylight, the intensity will vary so much that any measurements of the illumination and brightness levels throughout the room will not give a true relative picture of conditions. So a light meter has been placed on a sill, tilted 45° toward the sky, and simultaneously read with each of the other observations. The latter were then corrected for an average of the daylight levels. Leonard V. James shown using brightness meter and magnesium disc to check the accuracy of the light meter — Walter A. Meares is holding the disc.

CHICAGO BUILDING PROGRAM

Supt. Herold C. Hunt, of Chicago, Ill., has prepared a tentative school building program for 1952, estimated to cost $20,000,000. The program which is to be approved by the board of education, comprises 27 major projects, including six new schools, two branch schools, fifteen additions, three rehabilitated schools, and replacement of one old school. An important project in the program is a new Dunbar Trade School, to cost an estimated $2,500,000.

EAST MOLINE'S EXPANSION PROGRAM

The East Moline board of education, Dist. No. 37, East Moline, Ill., on November 17 conducted a successful referendum for a $100,000 bond issue. This is the second bond issue to be voted by the district for the construction of new school buildings. Priority ratings have been received from Washington so that the program will now make progress. The new buildings are needed at this time to meet the constantly increasing school enrollment.

CLASSROOM SEATING CAPACITY

(Concluded from page 37)

seating engineers. The modal distance in those installations was 24 or 25 inches.

In setting the distance of 36 inches between rows the total length of more than a score of different kinds of tablet-arm chairs was measured and tabulated, together with (1) the net arm length of the tablet arm itself; (2) the amount of the arm's overthrust beyond the front edge of the seat plate; (3) the curvature of the chair's back as it affects the distance between rows; (4) the distance found empirically to be required between the front edge of the seat plate of one chair and the back of the chair ahead of it; (5) the distance found to be necessary between the front edge of the arm and the back of the chair ahead of it.

Further observation was made by setting typical tablet-arm chairs in rows in actual classrooms and varying the distance between the rows from 5 to 18 inches. Observations of student comfort or lack of it and the amount of disarrangement of the chairs were made in an institution which serves some 17,000 students scattered from the junior college level to the graduate level.

The distance from the back of a seated student to the end of his knee varies with individuals, as do other physical features affecting seating arrangements, but the general all-round adjustments of students to seats are reasonably served with the distances accepted.

Additional observations were made in rooms where tablet-arm chairs, either loose or bolted to the floor, were placed on a series of rising floors within a room. Some floors rose in steps of 4 inches, some in steps as great as 13 inches. With these rising floors students can move along the front of one row of tablet-arm chairs conveniently with less space between the end of the tablet arm and the back of the seat ahead of them than they can on flat floors. Bodies can be turned and swung out more readily where seats occur on these rising floors. A common width of these successive floors is three feet in actual practice, but the distance also applies sensibly to the spacing of rows on flat floors.

Other observations were made in rooms where tablet-arm chairs were bolted permanently to the floor, both on flat floors and on tiered floors. These observations were compared with measurements taken in a number of auditoriums equipped with opera-type seats bolted to the floors. Distances between rows of seats varied somewhat from one auditorium to another but not enough to set aside the distance of 36 inches accepted here. Rather, the observations confirmed this distance as both reasonable and convenient.

It should be remarked that not every room for every class of student has to be seated precisely at distances of 3 feet between rows and 26 inches sideways between chairs — that is not the idea, but in computing the normal or standard capacity of a general-purpose classroom, for any one of several purposes, these two distances have been accepted in this report as the standard.

Square Feet per Student

Again, the technique reported here does *not* divide the total floor area into so many square feet per student. If one were to set a square-foot allowance for a standard pupil station in general-purpose classrooms which agrees well with the capacities set up in this method, it would be approximately 6.5 square feet per station *in that portion of the floor which is actually seated.* This technique introduces a difference in the way of approaching the student capacity of a classroom. It escapes many headaches encountered when the total floor area is related directly to some number of students.

As schoolrooms are converted to war-training purposes capacities must be estimated rapidly and dependably. As great numbers of returning servicemen must be schooled in postwar periods, classroom capacities must be estimated quickly and dependably. The table shown in this article will facilitate these purposes in addition to the continuing and more traditional necessities of school plant administrators.

BOSTON SCHOOL HEALTH PROGRAM

The program of the Boston department of school hygiene has been expanded in the postwar years. Conducted in accordance with the state law, it embraces health education as well as health service.

The program which is based on the health needs of the children, stresses the value of health and the importance of maintaining it through healthful living. The department offers technical advice to the school personnel and parents, and co-operates with the community agencies which deal with the health of the child.

The program of health services is preventive in nature. It aims at doing all possible to keep the child well and to minimize the occurrence of communicable diseases. It urges immunization of the child against certain diseases and tries to obtain the early correction of physical defects and to maintain high standards of health service.

The program of physical examination is opened by a preliminary inspection made at the start of the school year by the doctor and nurse. Next are periodic classroom inspections and daily inspections by doctor or nurse of children referred to them by the teacher. This includes the inspection of children returning to school after illness.

The nurse assists with the dental program by educating the child about the need for dental care. The dental program includes the examination of teeth, inspection by the nurse, nutritional and oral hygiene education, periodic examination, and treatment by family dentists and clinics.

A cumulative record is kept for each child, giving information about his physical condition, history of immunization, previous diseases, treatment, and follow-up work. Classroom record sheets contain individual records of physical defects, defects of vision and hearing, deviations from normal growth and development, and information relative to follow-up work, treatment, and correction of defects.

PRACTICAL ACOUSTICS

(Concluded from page 64)

so we had an additional 2350 units (4.7 per person). But as these people covered the seats, we had a total of 2770 absorption units to satisfy after subtracting the effects of the seating of 50 per cent of the floor area.

We substituted the above values in our formula $T = \frac{0.05 \times V}{A}$ and got $\frac{0.05 \times 84{,}000}{2770}$

or $T = 1.54$ seconds for this size room with a full audience. Checking back we found we were short 750 absorption units.

How to get these and apply them? The ceiling and walls were bare of ornamentation except that the ceiling had shallow beams. So it was decided to panel the ceiling and walls and use an acoustical panel board to give some decorative effect as well. The area of the panels was 3120 sq. ft. The material selected had a coefficient of 0.25 which gave a total of 780 units, slightly in excess of the required 730 units. The room turned out satisfactorily even with a two-thirds audience.

You will note that the only real subjective elements were the reverberation time and the amount, disposition, and kind of acoustical material. Of course this is not a refinement method, but so many variables were involved that the correction was made sufficiently accurate for all practical purposes.

May one hope that this simple presentation, sketchy though it is, has given the reader some idea of what the acoustical business is all about, and that after all there is nothing secret about it — all one has to do is to dig for himself into the subject and lo and behold, one knows all about it — by no means!

PERSONAL NEWS

SUPERINTENDENTS

► I. C. JOHNSON has accepted the superintendency of the Depue Unit School, at Depue, Ill. He succeeds Ray Stutz, who resigned to become principal of the high school at Mazon, Ill.

► EDWIN W. BORN, of St. Louis, Mich., has accepted the superintendency of the North Adams-Jerome school district at North Adams.

► RALPH W. BETTS has assumed his new position as superintendent at East Liverpool, Ohio. He was formerly principal of the high school.

► CARL COFFEEN, Cuyahoga Falls, Ohio, has been appointed a member of the Advisory Council of the American Association of School Administrators. Also appointed was RALPH M. GANTZ, of Steubenville, Ohio.

► WILLIAM J. ENGLISH has resigned from the superintendency at Lebanon, N. H., due to ill health. Mr. English had completed 38 years of educational work, of which 26 years were spent in the Lebanon supervisory union.

► JOHN DALE RUSSELL has resigned as Assistant Commissioner for Higher Education in the U. S. Office of Education, to become executive officer of the Bureau of Educational Finance for the state of New Mexico.

► HARRY D. YATES, late superintendent of schools at Lockport, Ill., died October 25 following a heart attack. Boyd R. Bucher succeeds Mr. Yates as superintendent.

► SUPT. H. W. STILWELL, of Texarkana, Tex., has been given an increase of $1,000 for the fiscal year 1951–52. The salary of the business manager was raised $500 for the year.

► JACK BROADHURST has been elected superintendent of schools at Mineral, Kans.

► H. H. OVERTON has been elected acting superintendent of schools at Malvern, Ark.

► JENNINGS NEWMAN has been named acting superintendent at Sapulpa, Okla.

► WILLIAM LESTER BODINE, for 47 years superintendent of compulsory education of the Chicago board of education, died November 26 in a nursing home. He had been retired since 1946.

► DR. WALLACE H. STREVELL, of White Plains, N. Y., has been appointed professor of education and chairman of the administrative supervision at the University of Houston, Houston, Tex. Dr. Strevell was formerly research consultant and director of the New York City office for the New York State Commission on School Buildings.

BOARD OFFICIALS

► The school board at Mulberry, Ark., has reorganized with PAUL ALEXANDER as president; B. J. FARMER as vice-president; and J. O. JORDAN as secretary.

► At Indianapolis, Ind., MRS. DALE R. DAVEE, JOSEPH GUIDONE, and G. M. SHOTWELL were elected members of the board for four-year terms in January, 1952; chosen for four-year terms beginning January 1, 1954 were MORTEN HANSEN and LEO GARDNER; PAUL JONES was elected to a term ending December 31, 1953, and EMIL SCHAAD to one ending December 31, 1952.

► DR. ADOLPH L. LEWIN has started his 41st year as a member of the Pittsburgh, Pa., Board of Education. Dr. Lewin is the only original member of the school board of 15 appointed in 1911. MISS LAURA M. BRAUN, named to a second six-year term on the Pittsburgh board, is starting her 49th year of educational service. She is a veteran teacher, retiring in 1945.

► Indiana County School Board reorganized at its annual meet in Indiana, Pa. JOHN A. CRIBBS, Clarksburg, was retained as secretary. J. PAUL HOPKINS, president of Marion Center School Board, and PAUL C. CRAIG, president of Armstrong Township Board, were elected new members, taking office in January, 1952.

► DR. JOHN S. RHOADS of Stoystown, Pa., with the close of 1951, rounds out a career as a school director dating back to 1909. He is retiring as a member of the Jenner-Boswell-Jennerstown Joint School Board. He served 12 years as president of the board.

STATE SCHOOL BUILDING AID

(Concluded from page 29)

such districts than to other districts in the state.

6. State building aid should be used for the purchase and improvement of sites, the purchase of built-in or fixed equipment, the construction of new buildings and additions to existing buildings, and the reconstruction and alteration of existing buildings.

7. No district should be granted school building aid unless it has levied the minimum tax rate prescribed by state law for school purposes.

8. The state department of education should have the authority to allocate school building aid to impoverished districts which lack the essential physical plant although they may be unable to meet the conditions set up as qualifications for aid; also, to allocate supplementary amounts of building aid to districts which are unable to provide the essential school plant with the funds provided under the limitations imposed by the state building aid law.

9. Any state building aid not expended by the district within a certain period of time should revert to the state.

10. All construction work on school buildings which qualifies for state building aid should be inspected and approved by the state department of education.

11. State building aid should be paid to the district in the form of outright grants with no repayment of any kind by the district.

12. Part of the state building aid should be paid on the basis of a fixed percentage of the cost of each approved school building project.

13. Part of the state aid for school buildings should be distributed to districts in the form of equalization aid, based upon the financial ability of the districts.

These principles are based on the evaluation of principles underlying the building aid programs of other states and an analysis of Minnesota public school conditions. They include no principle which has been classified as "unsound." They include every principle classified as "sound" by all groups of evaluators and two of the four principles so classified by one or more groups. A state building aid program based on these principles could be expected to function well in Minnesota. Through a similar process of fitting principles, as evaluated here, to the conditions within a state, a basic set of principles can be formulated to fit the specific situation in any state.

SMITH HOMEMAKING BUILDING

(Concluded from page 32)

for lectures. A large fitting room, with a three-way mirror occupies one wall of the fitting room. Adjoining it is a workroom for pressing and dyeing. Hot and cold water connections and an ample sink are provided.

The equipment in the kitchen, laundry, and sewing units differs in type and makes it possible to give the students experience in the use of various household utilities now on the market and in use in modern homes. There are both gas and electric ranges of different manufacturers; the work machines and dryers differ in model and operation; there are several types of gas and electric refrigerators; the sewing machines are typical of the best makes.

Ample storage facilities are provided for all areas of the homemaking building. In the homecraft and clothing rooms, students have their individual work trays in which they can store their work after class.

Construction materials in the building include concrete foundation and floor, wood frame and stucco walls, steel trusses, composition roof, aluminum exterior louvers, brick trim, steel sash windows, asphalt tile floors, hard plastic counter tops (kitchen units), plywood wainscoting, and acoustical tile ceiling. Asphalt concrete paving is used around the building.

All floors in all wings are covered with asphalt tile in various harmonizing colors. For example, the tile in front of the door of the south wing leading north into the patio is the same color as the brick outside the patio, and yet harmonizes with the lighter tile in other areas inside the wing.

A huge circular washbasin of terrazzo catches the water from a central fountain and enables a dozen girls to wash their hands at the same time.

The building also features a forced air heating and ventilating system.

Total cost of the building was $139,000.

The building was designed by Messrs. Daniel, Mann, Johnson and Mendenhall.

GOOD WILL IN EDUCATION

(Concluded from page 61)

son of the martyred president. It was issued in 1886 at one of the schools to be replaced by a new one in the building program.

Business and commercial concerns cooperated by alloting part of their radio and television advertising space to the building campaign.

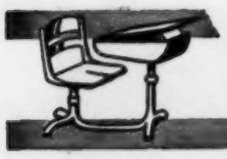
Articles were printed in the high school newspapers and taken to the homes by students.

Assemblies, gatherings, get-togethers, and parades were promoted throughout the city. Some high school students became political precinct canvassers for a day to carry the building bond message to the homes in their communities. Even troubador-like groups sung the needs and hopes for a greater Chicago educational system.

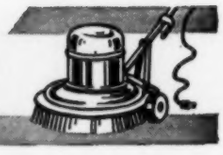
Not a solid, boisterous protest to the bond issue was recorded during the entire campaign for better schools for Chicago, and many attribute this condition to Educational Public Relations.

PARENT TEACHER PROBLEMS

The school board of the community consolidated District No. 65, Evanston, Ill., has begun a city-wide study of parent-teacher communication problems. As a result, several schools have initiated a system of parent conferences in lieu of written reports during two of the four reporting periods of the school year. Parents may ask for a personal conference with the teacher, or a written report. Parents and teachers alike have responded excellently to the program. Parents and teachers alike must indicate a desire to try this program before the administrative department gives its approval.



NEW SUPPLIES AND EQUIPMENT



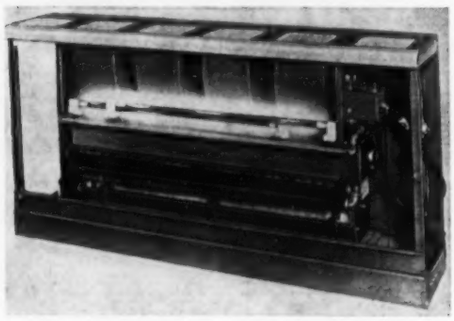
The Present Outlook

The pinch on materials which has been felt in the school building field, because of allocations of critical goods based on priority to military needs, is affecting heavy steel users mostly. Manufacturers using lightweight metals are experiencing some difficulty in obtaining necessary materials but not to a serious degree, at this point. In many cases where there is a shortage, adaptation of operations by using less critical materials is relatively easy. Provision apparently has been made for certain essential supplies for schools such as desks. Manufacturers are hopeful for the future and are having little trouble in promising prompt deliveries at this time.

A study of the new products and developments described below point to such a conclusion. THE EDITORS

Classroom Unit Ventilators With Germicidal Lamps

Another advancement for the health and protection of school children is now available with the announcement that all models of Herman Nelson Unit Ventilators may be obtained with germicidal lamps as an integral part of the equipment. This is the first time that germicidal lamps have been offered with unit ventilators and is the result of extensive co-ordinated research and testing. Because of the relatively crowded conditions of most schools, the need for bacteria killing equipment is of paramount importance. Respiratory diseases travel from person to person in many ways, but the most frequent is by air-borne bacteria and virus.



GERMICIDAL LAMP INSTALLATION

Complete information, illustrative data, and specifications for this new development may be obtained by writing, *Herman Nelson Division, American Air Filter Company, Inc., Moline, Ill.*

(For Convenience, Circle Index Code 010)

Ten Key Keyset Decimal Tabulation Feature

Ten key keyset decimal tabulation is featured in the new Underwood All Electric Fanfold Writing Machine announced by the manufacturer. The tabulator enables rapid positioning of the carriage to predetermined decimal locations to speed billing operations, and is located in the normal area immediately above the keyboard. The Underwood Electric Fanfold has been especially designed to eliminate all nonproductive operations in the preparation of forms that require one or more copies. These include invoices, orders, requisitions, and any other multi-copy records. The use of continuous forms has proved the most economical and fastest method of handling this type of work.

WRITING MACHINE IMPROVED

Electric operation assigns all of the hard work to the machine itself. All the operator has to do is touch the keys of the familiar standard typewriter keyboard. Uniform type impressions are automatic,

(Continued on page 98)

School Child's Welfare Reaffirmed As Sole Guide For NSSI Members

THAT the welfare of the school child should be the sole motivating force in the production and sales of equipment and supplies was reaffirmed by manufacturers and distributors at the 35th annual convention of the National School Service Institute held in Chicago in December.

O. H. Roberts, Jr., President of the Evansville, Indiana, School Board, cautioned the delegates that "schools do not exist to provide an avocation for me as a School Board Member — a profession for the teacher — football for the fans — a business for you — schools exist that we might give our children a challenging opportunity to provide the better world of which we've always dreamed and solve a few of the problems we've created for them." He urged the members to broaden and strengthen their programs so as to be of constructive good in the improvement of education. "Business," he said, "is learning and must continue to learn how important education is to them." He recommended that they should become citizens of their communities, join professionally in doing work for the common welfare so as "to make the name of school service really live for those with whom you come in contact."

Dramatizing the "tragic" situation which schools face next year as a result of the predicted increase of one million and a half more children going into the schools, Lew Parmenter, executive director of the association, emphasized the need for continuing pressure on the agencies directing government controls for materials because "though the government officials heard the story of education and have given it preference over everything but the military, the confusion in all the bureaus has produced little in result." Parmenter further called on members of the Institute "to build confidence with integrity — build faith with service by proclaiming their own individual policies and living up to their high ideals of service to the school children of America."

Harve H. Avants, retiring president of the Institute, emphasized how important it is for men in the business of supplying schools to "keep it honest." "As businessmen," he said, "we must assume our responsibility in making all commerce into a dynamic and useful force, not just for self and family or associates, but also for the general welfare."

In another address, Loren Douthit, chairman of the Manufacturers' Division of the Institute, called on the members to make available their "selling know-how" in selling the place of education in their own communities because aside from business considerations, as individual members of their community, "you have a responsibility to do something about making the public aware of the need for better schools." He showed how the schools are improved in direct proportion to the public's awareness of what the schools are doing.

PROFESSIONAL DIRECTORY

(Continued from page 96)

and ten pressure control settings automatically give any desired number of carbon copies.

For additional information write to *Underwood Corporation, Section S.B.J., One Park Avenue, New York 16, N. Y.*

(For Convenience, Circle Index Code 011)

Large Insulating Windows Engineered to Air Conditioning

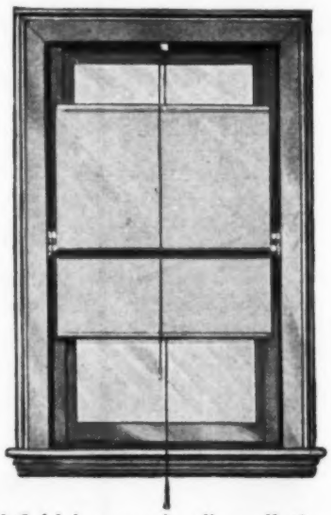
Large insulating windows may now be engineered to air-conditioning needs with the new and improved, low-expansion type, heat-absorbing plate glass available for fabrication into Thermopane units. The quarter-inch heat-absorbing plate glass excludes 61 per cent of total sun radiation but transmits 71 per cent of average daylight, when used in Thermopane with one light of the conventional quarter-inch polished plate glass. In some special cases a combination unit of two lights of the quarter-inch heat-absorbing glass may be used to exclude 78 per cent of solar radiation and transmit 62 per cent of daylight.

For additional information, write to *Libbey-Owens-Ford Glass Company, Section S.B.J., Toledo 3, Ohio.*

(For Convenience, Circle Index Code 012)

Newest Style Window Shade for Schools

The latest design in window shades for public buildings is the *Shadescope* — a *double shade* with only *one roller*. It telescopes toward the center of the window and has all of the advantages of any double roller shade. The company feels that this new style SS will be significant in the



school field because it offers all the excellent control of light and ventilation now obtained with the popular double roller shade — yet it is much more economical in first cost, installation, and maintenance.

Inquiries should be referred to the *Oliver C. Steele Manufacturing Company, Section S.B.J., Spiceland, Ind.*

(For Convenience, Circle Index Code 013)

Intercommunicating System Ties Into Bell and Buzzer

An intercommunicating telephone system for schools which ties into the bell and buzzer hookups of existing clock and program installations has been recently developed. This saves on the cost of equipment and eliminates the need of separate conduits and extra wiring. With a button control board already in use, addition of the telephone system is simple. A twisted pair of telephone wires can be pulled through the same conduit as the clock and program units, with no need for special call buttons or switchboards and signals on the telephones themselves.

The telephones are available as single units with button control board, as well as in combination with the timing devices.

For information write to *Edwards & Company, Inc., Section S.B.J., Norwalk, Conn.*

(For Convenience, Circle Index Code 014)

Wall-Hung Fixtures for Women's Rest Rooms

A new wall-hung Sanistand fixture for women's rest rooms is now available. Wall-hung for easier installation and maintenance, this new unit is made of genuine vitreous china in white or a variety of pastel shades. Especially easy to clean in a hurry, the wall-hung Sanistand fixture, like the floor model, has no seat to become contaminated. Its unusually powerful flushing action adds to its hygienic qualities, too, and makes the cleaning job easier. Women patrons by the thousands have already expressed their approval of the Sanistand fixture. They like it because they can use it without touching it. These discriminating women realize that the Sanistand fixture thereby lessens the possible danger of visiting public rest rooms.

For further information, address inquiries to *American Radiator & Standard Sanitary Corp., Section S.B.J., P. O. Box 1226, Pittsburgh 30, Pa.*

(For Convenience, Circle Index Code 015)

New Coating for Locker and Shower Room Walls

A special coating for painting locker and shower room walls has been announced by United Laboratories of Cleveland, Ohio. Known as Certified Wet Surface Enamel No. 445, the product is especially adaptable to painting surfaces which are constantly damp. Ordinary paints used for such purposes are subject to easy pealing and will usually not withstand the constant moisture in the air and on the surface. Wet Surface Enamel No. 445 may be applied directly to clean surfaces which are actually damp at the time of

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application. The material is available in white and several colors.

For more information, write *United Laboratories, Inc., Section S.B.J., Cleveland, Ohio.*

(For Convenience, Circle Index Code 016)

Film to Deter Property Damage Being Widely Used

Most young people would not rough up other people's property if they could foresee the consequences of their actions, and their own embarrassment and the disapproval of other boys and girls. But this kind of foresight isn't in them. The Young America Films has produced as one of its teaching films, a short called "Other People's Property." With the schoolroom as background and scene of the destruction, the film tells how three boys plotted revenge on a teacher one of them disliked. All three were sick of the plan before they had the opportunity to carry it out, and thoroughly disillusioned after it was over and the damage done. In using the film, teachers are urged to introduce the subject, then show the film, then conduct a discussion of it.

For more details write to *Young America Films, Section S.B.J., 18 East 41st Street, New York 17, N. Y.*

(For Convenience, Circle Index Code 017)

FOLDING DOORS IN USE

Schools Find Folding Doors Expand Facilities

Many schools are finding *Modernfold* doors excellent for converting an existing classroom into two or more rooms simply, quickly, and economically. *Modernfold* increases classroom space, provides better group control, and insures more effective teaching. It also gives far greater flexibility than a permanent wall because it can quickly and easily fold against the wall if consolidation of the entire area is desired. It can be adapted to improve most school facilities . . . cafeteria, study hall, library, school offices, stage, student wardrobes, faculty and student housing. Everywhere it means more *"double-duty space"* through flexible partitioning.

For information write to *New Castle Products, Section S.B.J., New Castle, Ind.*

(For Convenience, Circle Index Code 018)

Helpful Gym Marking Chart Obtainable Free

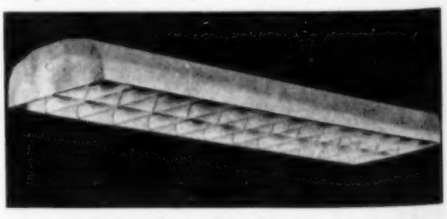
Attracting welcome response from hundreds of architects, coaches, and physical education directors, is Hillyard's new AIA data file 25-G. This new chart accurately blueprints standard court makings for basketball, volleyball, and every gym activity. Planned as a practical work guide, Hillyard Chemical Company has designed it in regulation 11 by 8½ in. easy-to-file architectural style. The folder cover is an actual blueprint diagram of a gymnasium with standard court markings scaled to size for "on sight" reference. Measurements include those for junior high school age, high school age, and college age. The back cover pictures the six procedure steps for doing the job correctly, in the easiest, most economical manner.

A copy of this helpful new chart (AIA File No. 25-G) may be obtained *without cost* from *Hillyard, Section S.B.J., St. Joseph, Mo.*

(For Convenience, Circle Index Code 019)

48-inch Fluorescent Luminaire Just Introduced

An all-white 2-lamp Fluorescent Luminaire of trim, clean cut appearance and over-all efficiency of 82 per cent has just been introduced. It is especially suited for use in schools, where high-quality, low-cost illumination is essential. The "Norwin" combines many quality features — a rugged chassis; egg-crate louver assembly which hinges from either side for quick, easy maintenance; 25° crosswise and 35° lengthwise shielding. Sheet-steel side panels are welded to die-stamped ends; simplified installation keeps down initial costs. No tools are needed for servicing; while



LOW COST ILLUMINATION

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continued high efficiency through the years is assured by Pittsburgh's hot-bond, high efficiency white finish with a minimum reflective of 87 per cent. The "Norwin" is 48⅛ in. long, 17 in. wide, 5 in. deep, and uses two T-12 40-watt lamps.

For additional information, write to *Pittsburgh Reflector Company, Section S.B.J., 418 Oliver Building, Pittsburgh 22, Pa.*, requesting Bulletin C5-1.

(For Convenience, Circle Index Code 020)

Darkening Shades Now Usable on Common Fixture

Draper V-Double Roller Shades are made with a demountable pulley and also provide for the use of darkening shades, using the same common fixture as the translucent shades, i.e., the pulley bracket. This results in lower costs to the school and a provision for darkening in each and every classroom in the future, if not intended at the time. The Pakfold shade is also less likely to be "affected by the pinch" than any other style of shade which the company manufactures.

A copy of the latest catalog describing the full line of Sight-Saving Translucent and Durable Darkening Window Shades is available from the *Luther O. Draper Shade Company, Section S.B.J., Spiceland, Ind.*

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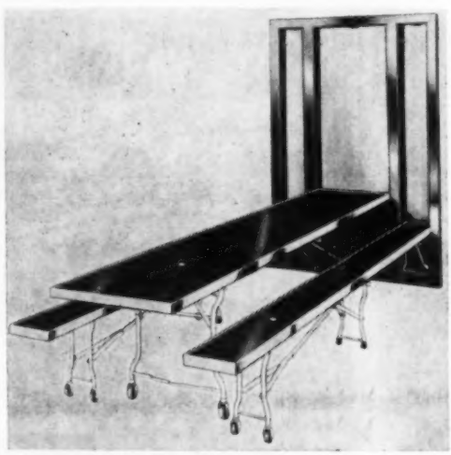

LOW TABLE MODEL

Lower In-Wall Folding Table and Bench Model Announced

A new In-Wall Table and Bench Unit designed to accommodate numerous requests received from school officials across the country, has just been announced. The new model features tables of the standard 13 ft. 8 in. length but 25 in. instead of 30 in. in height. Benches are likewise 5 in. lower in the new model. It will seat 10 students on each side the same as always.

For information write to *Schieber Manufacturing Company, Section S.B.J., 12720 Bure Road, Detroit, Mich.*

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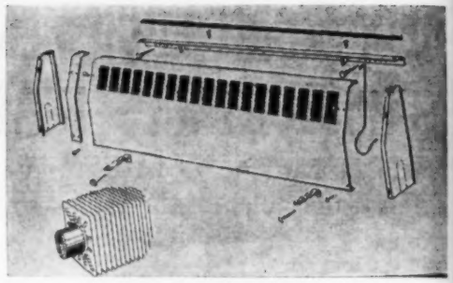

EXPLODED VIEW

True Perimeter Heating for Schools

Exploded view of Webster Walvector showing component parts — heating surface of copper tubing and aluminum fins, sturdy steel enclosure, mounting angle, and hangers. Installed close to the floor, Webster Walvector spreads a curtain of warmth all along the exposed walls of the school — true perimeter heating. It develops a natural circulation that keeps rooms comfortably warm at every point.

For information write to *Warner Webster & Company, Section S.B.J., Philadelphia, Pa.*

(For Convenience, Circle Index Code 023)

Radiant Electric Heating Through Glass

Radiant electric heating through glass is a new development which has been gaining wide acceptance. Trademarked Glassheat, the panels cost much less to install than other systems. With a heat loss of only 5 per cent compared with 50 per cent in conventional units, fuel savings are great. A minimum of maintenance is required. The system uses tempered glass panels sprayed with molten aluminum. The glass is mounted in an aluminum reflector pan which catches the heat and sends it back into the room. The reflector is enclosed in a metal pan for support. The entire unit is installed and connected with the wiring system in the wall. The heat is produced by infra-red rays.

For more information, check *Continental Radiant Glass Heating Corp., Section S.B.J., 1 East 35th Street, New York, N. Y.*

(For Convenience, Circle Index Code 024)

GLASS HEATING PANEL